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VOLATILE OIL OF ARISTOLOCHIA RETICULATA, *NUTTALL.*

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From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

Literature. — Bucholz (1807), *National Dispensatory*, (3d ed., page, 1368). T. S. Wiegand, (Amer. Jour. Pharm., 1845, page 10). J. A. Ferguson, (ibid., 1887, page 481). M. Spica, (*Gazzetta di Chimica* XVII, 1887, page 313–316).[1]

The following abstract from the "Journal of the Chemical Society," explains the work of the last quoted authority.

"On distilling the ethereal extract of the root in a current of steam, a yellowish green oil is obtained, heavier than water, and having an odor resembling that of camphor and valerian. This oil, after treatment with potash, is cooled by a freezing mixture, which causes the separation of a crystalline stearopten; this melts at 198°, boils at 212°, and is shown by chemical analysis and its physical properties to be borneol. No very definite product could be obtained from the oil from which the borneol had thus been separated."

Remarks.—This work was carried out in the Chemical Laboratory of the Philadelphia College of Pharmacy, under the supervision of Prof. Henry Trimble, to whom the author is indebted for many valuable suggestions. It was commenced about the middle of June, 1890.

The rhizome and rootlets were used as obtained through reliable

[1] Of old references may also be mentioned the researches of Chevallier (*Jour. de Phar.*, 1820) and Peschier (*Trommsdorff, Taschenbuch*, 1823).—Editor.

channels of the drug market. The amount of the material used was about forty-five kilograms.

The same Centigrade thermometer was used in all instances except where more than one was required, when its fellows were compared with it. The boiling points in air were taken on a sand bath; a thin test tube, containing sufficient substance to completely submerge the thermometer bulb, being used. The several temperatures stated in giving the boiling points of the oils were points at which, in the first given, the oil showed ebullition, and, in the others, increased vigor, until the highest and apparently constant boiling temperature was reached. Between these several points the temperature rose slowly.

The specific gravities were taken by means of the bottle.

The rotary powers were taken with a Wilde's polaristrobometer with the use of the sodium flame. The one hundred millimeter tube was used, as the color of the oil would not allow the use of a longer column.

The barometic pressures were reduced to 0° from the observed height of the mercury column, as a correction for atmospheric temperature, and are here stated in millimeters. All the rectifications and distillations were conducted under reduced pressure. Upon boiling the oils and the fractions in air all became darker in color, but the other physical properties remained unchanged.

By appropriate tests the oil was found to be composed entirely of carbon, hydrogen and oxygen. The combustions were made in an open tube with cupric oxide and a stream of oxygen; the vapor densities with the Victor Meyer apparatus, and the results calculated by the rule which eliminates all differences in barometric and thermometric influences and gives the density of the vapor of the substance at 0·760° mm. pressure, compared with air under similar conditions. The compounds were vaporized in a flask heated to from 40–50° above their boiling points.

Distillation.—The contused drug in quantities of about two kilograms, was macerated over night with about six litres of water, and then distilled, the volume of water being maintained by additions from time to time through the tubulure of the still. It was found when four litres of distillate had been collected that the drug was exhausted of oil. The distillate was collected in quantities of one litre, and the oil which separated from each portion was specifically lighter than that respective part of the distillate.

The oil which separated with some difficulty in very small quantity from the first litre was colorless. The second litre yielded a transparent lemon yellow oily layer constituting about one-half of the whole yield. From the third litre a greenish layer of oil was obtained in about one-fourth of the entire amount. Green oil in about the same amount was separated from the fourth litre. In the subsequent distillations the process of cohobation was employed.

The watery distillates were neutral to litmus. The oil was dried by means of neutral calcium chloride.

The yield of oil from three commercial lots of the rhizome (lot III amounting to about 25 kilograms) was as follows: (I) ·94 per cent., (II) ·73 per cent. and (III) ·61 per cent.; the average being ·76 per cent. The oil from lot III was used for most of this work.

Properties of the Volatile Oil.—In bulk the oil was of an amber or golden yellow color, in thin layers greenish yellow; odor camphoraceous and mildly valerianic; taste, camphor-like, with but little sensation of cold when air was drawn into the mouth; reaction, neutral or indistinctly acid. On exposure, in thin layers, the oil dried slowly to a varnish film.

All the different lots of oil agreed closely with this description, and all failed to separate solids at a prolonged exposure to —17° to —15° in a freezing mixture of salt and ice, or in a snow-bank over night; the only change noticed was the usual one of increased viscosity.

The specific gravity of the oil from lot I was ·9785 at 15·5°, and ·9758 at 20° C.; and from lot III ·9745 and ·9719, respectively.

The rise in the boiling point was noted as follows:

No. Oil.	Commenced.	Increased.	Brisk.	Full and Constant.	Barom. Press.
I,	163°	172°	204°	207–210°	757·7 mm.
III,	165°	179°	205°	213–214°	767·3 mm.

The rotary power was ascertained to be —4·0 in a 100 mm. tube; temperature of the oil 20·5°.

The oil is readily soluble in, or miscible with, an equal volume of ether, chloroform, benzol, benzin (boiling point 45–80°), methyl alcohol, carbon disulphide, turpentine, glacial acetic acid, bromethane, ethylene dibromide, nitro-benzol, ethyl benzoate, aniline, toluol, and olive oil; not so freely soluble in ethyl acetate; sparingly in water; almost insoluble in acetic aldehyde and in glycerin (sp. gr. 1·25); apparently miscible in all proportions with alcohol (sp. gr. ·820).

When heated with finely powdered copper nitroprusside, no change in color was noticed. Fröhde's reagent in equal quantity gave rapidly a black color which was produced slowly by sulphuric acid alone. An equal amount of five per cent. alcoholic solution of ferric chloride, at first, gave a greenish color (due to reduction of the ferric compound), the mixture gradually became dark red brown, almost black, and resinous in about an hour. The odor and taste seemed to be unchanged.

Neither alcoholic solution of ammonium sulphide nor saturated aqueous solution of sodium acid sulphite gave indications of aldehydes or of ketones. With the last reagent a cherry red color was slowly developed, but after separating and washing the oil, the taste and odor were found unchanged.

Rectification.—This was effected by a simple distillation of the oil, under reduced pressure on an oil bath, the process being continued as long as the oil distilled without decomposition. The same colors were noticed in the distillate thus obtained as in the distillation from the rhizome.

The residue in the flask at the end of the operation was red brown, resinous, acid in reaction, and solidified upon cooling. Further distillation of this residue gave only decomposition products, as the distillates so obtained boiled in air at much lower temperatures than those required for their production under the diminished pressure.

The rectified oil, consisting of the mixed distillates obtained previous to threatened decomposition, was of a greenish yellow color; camphoraceous in odor and taste, and neutral in reaction.

The specific gravity at 15·5° was (I) ·955, (III) ·9675, and at 20° C. ·953 and ·9648, respectively.

The rectified oil commenced to boil at 165°; boiling increased at 177°; was brisk at 195–200°, and constant between 207 and 208·5; barom. pressure 756·7 mm.

The rotary power of the rectified oil (temperature 25°, 100 mm. tube) was —16·5.

Rectification did not change the behavior toward the solvents mentioned before, but the rotary power indicated that the decomposition in the highest boiling portions took place at the expense of dextro-rotary substances.

Fractional Distillation.—This operation was conducted on an oil bath, and by its means the rectified oil was separated into the frac-

tions mentioned below. The many repetitions of the operation are omitted and only those temperatures which refer to final distillates are given.

Fraction.	Boiling Point.	Pressure.	Approx. Amount.
A,	74–75°	43 mm.	10 per cent.
B,	122–124°	43 "	60 "
C,	147–150°	47·7 "	20 "
D,	green and bluish fluorescent oils, and decomposition resins,		10 "

The fractions when subjected to low temperatures, as was the original oil, all behaved as the latter. All were readily soluble in glacial acetic acid, and these solutions reacted with sulphuric acid, as follows:

A, Pink, becoming brownish.

B, Pink, becoming brown.

C, Red, deepening.

This reaction of A is that given by some of the pinene groups of terpenes, according to Wallach (*Liebig's Annalen, 239*, page 1; also, AMER. JOUR. PHARM., 1887, page 619.)

Fraction A.—Boiling point in air 157°, barom. pressure 769·6 mm. Pale greenish (in time becoming colorless, but other physical properties remaining unchanged) liquid of a peculiar penetrating, irritating, terebinthinate odor; a peculiar, characteristic taste, and an acid reaction. When blue litmus paper was held above the liquid it became red quite rapidly. Satisfactory tests were not obtained, with either wet or dry starch and potassium iodide paper, for ozone. Water agitated with the compound was subsequently found to contain acetic acid. It absorbed bromine with avidity. Specific gravity at 15·5° C., ·865. It was obtained by fractional distillation alone, and without the use of metallic sodium or zinc.

The average of two closely agreeing results of combustions made of this fraction was:

	Found.	Calculated for $C_{10}H_{16}$.
C,	88·225	88·23
H,	11·835	11·77
	100·060	100·00

Vapor density: Found 4·82, 4·84; calculated for $C_{10}H_{16}$, 4·71.

Fraction B.—Boiling point in air 211°, barom. pressure 763·6 mm. Pale greenish, almost colorless, liquid, having an odor and

a taste similar to those of the oil, and a neutral reaction. Sp. gr. at 15·5°, ·9849.

The average of five closely agreeing combustions was:

	Found.	Calculated for $C_{15}H_{25}O_2$.
C,	75·94	75·95
H,	10·64	10·55
O,	13·42	13·50
	100·00	100·00

Vapor density: Found 8·28, 8·27; calculated for $C_{15}H_{25}O_2$, 8·20.

Fraction C.—Boiling point in air 239–240°, barom. pressure 762·1 mm. This was a yellowish green liquid, of a buchu-like odor; warm, mildly camphoraceous taste; and a neutral reaction. Sp. gr. at 15·5°, ·9888.

The average of three closely agreeing combustions was:

	Found.	Calculated for $C_{18}H_{29}O$
C,	82·69	82·76
H,	11·07	11·11
O,	6·24	6·13
	100·00	100·00

Vapor density: Found 8·89; calculated for $C_{18}H_{29}O$, 9·04.

Fraction D.—This consisted of the green and bluish-green fluorescent oils, but, as they were easily converted into the resinous decomposition compounds always obtained in the distillation of this oil, it was not found possible to separate them by means of distillation, in a state of purity essential for ultimate analysis, nor could they be obtained in this condition by collecting the oil of the fourth litre of distillate and distilling it. In the several lots so treated only a very small amount of distillate from each was obtained above the boiling point of fraction C, and these varied in color, reaction to litmus, and to reagents—all, however, were empyreumatic, camphoraceous and specifically lighter than water.

Saponification of Fraction B.—The formula of this fraction suggesting it to be an ester, the action of alkali was tried upon it. For this purpose a portion of the fraction was heated with half its weight of potassium hydrate, in aqueous solution, in a flask attached to an upright condenser, on a water-bath at the boiling point for about two hours, frequently shaking the mixture. The contents of the flask, which consisted of two layers, were now diluted with water, and the mixture distilled, when a distillate was obtained in which was a

white crystalline camphor-like body. The distillation was continued until the water coming over was perfectly clear, and free from odor and taste.

The contents of the flask were now one layer only; this was carefully acidified with dilute sulphuric acid, the distilling flask again attached to a condenser and the process continued, when another crystalline substance was obtained along with the watery distillate. This last substance was redistilled with water vapor, when it again appeared, as before, in a crystalline form of white dazzling scales (much like benzoic acid) floating on the distillate.

This distillate possessed an acidulous but not pleasant taste and a peculiar, somewhat sour, odor, which was not like that of valerianic acid.

The crystals and also the distillate were strongly acid, and decomposed sodium and calcium carbonates giving soluble salts. The ammonium salt was also soluble. When converted into these salts the odor disappeared, but was again produced by acidifying these compounds with dilute sulphuric acid. The aqueous solution of the free acid gave with ferric chloride a bulky, flesh-colored precipitate. The solution of its neutral salts acted in the same way, but the filtrate (containing the excess of the iron compound) from the precipitate was not red. The crystalline acid substance melted to a yellowish liquid, at a temperature below the boiling point of water, probably at about 65°.

In a second attempt to prepare more of the above acid from some of the fraction containing a small amount of the terpene, the acid separated as an oily liquid, but possessed the other physical properties of the solid acid, and gave the same reaction with ferric chloride, except that the filtrate in the case of its salts was red and upon boiling gave a red-brown precipitate, the cause of which (as was proved by mercuric chloride and by the acetic ether tests) was due to acetic acid.

Another experiment with the pure fraction gave a solid acid, but the small quantity operated on did not yield sufficient to permit it being collected as a solid; no oily layer separated in this case; the distillate was found to be free from acetic acid, and in all physical properties was the same as the distillate obtained with the first crystalline acid.

It might be said by way of parenthesis that an accident prevented

the preparation of the acid in sufficient quantity to ascertain its ultimate composition.

Alcoholic Base of Fraction B.—This was the white crystalline camphor-like body distilled from the saponified fraction. It was recrystallized from stronger ether until the melting point was constant. From this solvent it crystallized in transparent plates, which melted between 199·5–200°. It was sublimable, apparently, without decomposition, condensing in feathery forms in stellate groups. It burnt with a luminous, sooty flame, and was soluble in alcohol.

The crystals were submitted to combustion, the average of two closely agreeing results was:

	Found.	Calculated for $C_{10}H_{18}O$. Borneol.
C,	77·84	77·92
H,	11·69	11·69
O,	10·47	10·39
	100·00	100·00

Vapor density: Found 5·18; calculated for Borneol, 5·33.

Acid Radical of Fraction B.—From the formula of the ester, indicated by combustion and vapor density, this crystalline acid would have the composition $C_5H_9O_2$. From the experiments it appears to be monobasic and quite freely soluble in water.

Recapitulation.—It appears from the above observations that this oil consists of

(I) A terpene, $C_{10}H_{16}$, boiling at 157°; of sp. gr. ·865; having a strong affinity for bromine: characters which ally it to the pinene group of Wallach's classification.

(II) A fraction, boiling at 211°; of sp. gr. ·9849; having the composition $C_{15}H_{25}O_2$; and which by saponification with potassium hydrate gives a camphor-like body melting at 199·5–200°; having the composition $C_{10}H_{18}O$, and other properties of borneol; and a peculiar acid substance. This fraction comprises about 60 per cent. of the oil, and it in turn consists of about two-thirds borneol.

(III) A fraction boiling between 239–240°, of sp. gr. ·9888, having the composition $C_{18}H_{29}O$; and being, apparently, a neutral or indifferent substance.

(IV) Some green or bluish-green fluorescent oil, in small quantity, which readily decomposes at the temperature necessary for its distillation under reduced pressure.

GERANIUM MACULATUM.

By Henry Trimble and Josiah C. Peacock.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 87.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

In this Journal, 1889, page 238, was published the results of a proximate analysis of this drug by Henry J. Mayers, who undertook the investigation with the object of determining the constituents as well as the amount of tannin. Bowman, this Journal, 1869, p. 193, found 13·41 and 17·25 per cent. of tannin, but Mayers found in a commercial powdered sample, from a reliable source, only 4·25 per cent., and in a sample powdered by himself 11·53 per cent. of tannin. He, as well as Dr. Edward Staples, this Journal, 1829, p. 171, reported gallic acid.

The above, somewhat conflicting results, together with the thought that the time of collection might affect the tannin strength, were the inciting causes for the following investigation.

Fourteen collections of the rhizome were made between May 1, 1889, and May 13, 1891; the locality, Fairmount Park, was the same for all but three. The rootlets and adhering earth were carefully removed and the tannin determined as soon as practicable after the collection, always within twenty-four hours. The moisture was determined at the same time. The method employed for determining the tannin was to make a decoction of the drug, precipitate with gelatin and alum, wash, dry and weigh the precipitate and calculate 54 per cent. of it as tannin. The average of three closely agreeing results was used.

Time of collection.	Condition.	Per cent. of tannin.		Moisture.
		In the moist drug.	Calculated for absolutely dry drug.	
January,	Leaves absent,	4·34	11·72	62·99
March,	Leaves absent,	3·61	12·82	71·84
April,	Before blooming,	6·76	27·85	75·73
April,	While blooming,	5·85	23·44	75·05
May,	Before blooming,	4·13	16·34	74·73
May,	While blooming,	3·22	13·38	75·94
May,	After blooming,	3·60	12·38	70·93
July,		3·63	12·41	70·75
October,		3·68	9·72	62·16

Where collections were made at the same season and under similar conditions in different years an average of the results was taken. In 1891 the plant bloomed earlier than it did in 1890, which will account for the statement of blooming in both April and May. It will be evident from an examination of the above figures that in the spring, just before blooming, is the best time for collecting the drug. It will also appear that in this plant the tannin is a storage material used in assisting the plant to bloom.

Every one of the fourteen lots gathered was tested for gallic acid by agitating the decoction with ether, allowing the separated ether to evaporate, and testing the residue.

Negative results were gotten in nearly every case, and where they were not, the evidence was only that of mere traces. Gallic acid does not exist in the plant, but is easily found in the rhizome after drying, resulting from the easily decomposable tannin. Direct extraction of the fresh rhizome also failed to show the presence of gallic acid.

EXTRACTION OF THE TANNIN.

To obtain this principle, a quantity of the dried and finely ground drug was percolated with ether, specific gravity, 0·750, the solvent distilled, the extracted matter treated with water, filtered and the tannin precipitated from the filtrate with lead acetate. This precipitate was rapidly washed, decomposed by hydrogen sulphide in the presence of water and concentrated by distillation under reduced pressure. The concentrated solution was agitated with stronger ether, which was subsequently separated and the distillation of the aqueous solution continued, under the above conditions, to dryness, a red-brown, somewhat porous mass being obtained. The ether removed considerable gallic acid.

This tannin was not completely soluble in cold, but readily soluble in hot water. Weak solutions remained permanent for a reasonable time, but a one per cent. solution rapidly deposited a red-brown precipitate which may be called *geranium red.* After this deposition the solution was red in color and reacted as follows with a number of tannin reagents:

Cobalt acetate,	purplish brown ppt.
Manganese acetate,	light " "
Uranium acetate,	dark-red color.
Potassium dichromate,	brown precipitate.

Calcium hydrate,	purplish precipitate.
Tartar emetic and Ammonium chloride,	light brown "
Copper sulphate,	cloudiness
Same and excess of Ammonium hydrate,	dark-brown precipitate.
Ferrous sulphate,	no change
Ferric acetate,	blue-black ppt.
Gelatin,	red-brown "
Ammoniacal picric acid,	red color
Lead acetate,	drab precipitate.
Copper acetate,	brown "

In almost all cases these reactions were identical with those produced by the same reagents on gallo-tannic acid.

The action of heat was tried on this tannin, as recommended by T. E. Thorpe,[1] and here as with gallo-tannic acid it was found that pyrogallol resulted.

0·200 gram of the tannin, heated to 100° C., with 2 per cent. hydrochloric acid, for several hours, yielded a solution which upon cooling deposited a dark red-brown precipitate, soluble in alcohol and reprecipitated by water and having the other properties of a phlobaphene. The filtered liquid was agitated with acetic ether, which removed gallic, but no tannic acid, and but little coloring matter. After this agitation stronger ether removed the last portions of gallic acid, but no color.

The aqueous solution was now, as originally, red in color; it was heated to remove the ether, neutralized with sodium hydrate, precipitated with lead acetate, filtered, the excess of lead salt removed from the colorless filtrate by dilute sulphuric acid, again filtered, made alkaline with sodium hydrate, filtered and heated with Fehling's solution. The precipitated cuprous oxide upon ignition yielded 0·033 grams of cupric oxide, equal to 7·42 per cent. of glucose. From the same quantity of the tannin, after treatment with lead acetate and removal of excess of lead, as above, there were obtained 2·02 per cent. of glucose, thus indicating the tannin to be a glucoside decomposable into gallic acid, glucose and geranium red.

Glycerite of Iodol is prepared by Egasse by dissolving iodol 1 gm. in alcohol 16 gm., and adding glycerin 34 gm.

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[1] Chemical News, 43, p. 109.

THE JUICE OF THE GARDEN CUCUMBER.

By William B. Thompson.

Fashion and fancy prescribe for Pharmacy as well as for other requirements of civilized life, and it is, perhaps, not wise to be too scrupulous in regard to the utility of such prescriptions, especially when skill and art can make them serve some useful purposes.

Occasionally, in our domestic Pharmacy there is an inquiry for an ointment of cucumber, and whilst the fruit is abundantly indigenous and quite familiar as an edible for the table, we seem to look to foreign sources for a supply of material out of which to fabricate a medical preparation. A Spirit of Cucumber is imported and sometimes to be found in the stock of some of the larger dispensing establishments, but when wanted it may be accessible or not, just as circumstances exist. This fact would indicate a want of thrift, and show a rather deplorable dependence on the foresight of others, but it may be explained, perhaps, on the theory that the demand is so seldom made, that but little interest is incited, and herein lies an observable fault of the average Pharmacist. An excuse for some omission is the rule, the absence of it constitutes the exception. In order, however, to be prepared for even a casual emergency, all Pharmacists may with but little trouble and expense, not worth estimating, make themselves independent of other sources of supply than that of their own stock rooms, by preparing, by mechanical pressure, the juice of the fruit when in full season, and with a suitable antiseptic added, set it aside for an indefinite preservation. Then, if ingenuity is to be an exercise of daily work (and there is always a fair reward for this when coupled with judgment), the juice may be fashioned into lotions, and lavements, and unguents, to protect the skin against the fiery rays of Sol at mountain and seaside when the outing days are in vogue; for the lady patrons are sensitive as to blemishes upon a fair complexion, and readily endorse toilet novelties.

The French Pharmacists, who seem to still excel in the nicer manipulations of extemporaneous pharmacy, pretend to have found much virtue in the juice of the cucumber as a cooling balm, and gentle remedial in some forms of dermic condition.

Readers, by referring to the pages of this Journal, will find in volume xxvi (September No., 1854), page 426, an article by Emile Mouchon, of Lyons, extracted from a French periodical, upon the

subject of a distilled spirit, and an ointment of cucumbers from which it will be seen that the subject had attracted attention from various foreign authors.

The writer of these notes, during some experiments for the purpose of observing the action of the various recognized antiseptics upon vegetable and fruit juices, included the cucumber, and was somewhat surprised to find in it or its juice one of the most tractable substances—some samples, now preserved for three years, and exhibited at a recent pharmaceutical meeting, show no perceptible change except, perhaps, in a darker coloration—the odor, taste and gravity are apparently unaltered. This, in a simple, plain way, demonstrates a fact that may be of interest or even use. It would hardly seem necessary in view of these results to prepare a spirit as suggested by M. Emile Mouchon, but to make an ointment directly from the expressed juice, and thus secure greater concentration of qualities, for it is questionable whether an alcoholic menstruum would represent *more* than the peculiar aroma of the vegetable. Of course, in concentrating the watery solution, or natural juice, in fat or lard, greater care in regulating temperature would be required. Beyond this a spirit would have no advantage or preference.

The most successful antiseptics used were boric and salicylic acids and alcohol, a decided preference being given to the salicylic acid. The proportions used in the case of the acids were 2 grains to each fluid ounce of the expressed juice; of alcohol 8 fluid drachms to 16 fluid ounces. Either of the three agents will answer the purpose well, but the natural characteristics, in all respects, appear to be retained in better degree by the salicylic acid. As but a limited amount of the acid is dissolved it is better to allow it to remain in the juice, diffused by occasional shaking.

To those not familiar with the modern processes for the preservation of fruit-juices (those luxuries, in a pure state, of the soda fountain), it will be a matter of pleasing as well as profitable surprise to experiment a little and become aware of the very simple and easy means by which every Pharmacist may prepare these products.

Mercuric Collodion, recommended by Dr. Kaposi as a remedy for warts, is prepared by dissolving one part of mercuric chloride in 30 parts of flexible collodion. The collodion is applied with a brush once daily to the wart and around its base.—*Quarterly Therap. Rev.*, Jan., 1891.

ASSAY OF FERRIC HYPOPHOSPHITE.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 88.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

In previous papers (Am. Journ. Pharm., 1889, 326 and 386) on "The examination of officinal hypophosphites," several methods for estimating these salts were described: (1) With potassium permanganate; (2) with mercuric chloride and (3) with sodium hydrate, after oxidation with bromine; 1 and 3 are volumetric methods, while 2 is a gravimetric method. Of these methods the second one was stated to be the more likely one to be used in stores, although requiring much more time than the other methods.

In the examination of ferric hypophosphite it was found at that time that correct results were not obtainable, working under the same conditions as with the other hypophosphites and for this salt the third method was recommended. The difficulty explained already at that time, was due to the oxidation of the hypophosphite (with reduction of the ferric salt) in obtaining the salt in solution.

Recently I have made some further experiments with this method with the result that I was able to successfully estimate this hypophosphite with mercuric chloride; the details are as follows:

0·2 finely powdered ferric hypophosphite, 1·0 citric acid and 25 cc. water, are placed in a beaker and stirred for several minutes until the acid dissolves; then ammonia water is added slowly until the liquid smells strongly of it (this has for its object the decomposition of the ferric hypophosphite, the ferric hydrate entering largely into solution through the agency of the ammonium citrate present); after allowing to stand for ten minutes with frequent stirring to completely decompose the iron salt, 75 cc. of a cold saturated solution of mercuric chloride are added and then hydrochloric acid, drop by drop, stirring constantly until an almost colorless solution results and the calomel commences to precipitate (before the addition of the mercuric chloride the solution is of a brownish color, generally containing a little ferric hydrate suspended; the mercuric chloride solution causes a heavy white precipitate, which by the addition of a few drops of hydrochloric acid dissolves again, forming a brownish or greenish solution; the addition of more acid gradually produces decoloration; as soon as the liquid becomes colorless separa-

tion of calomel commences), allow to stand for one-half hour and then place for a further half-hour in a water-bath at 100° C. Collect the precipitate upon a weighed filter, wash with boiling water, dry at 100° C. and weigh. The weight of the calomel multiplied by ·088934 gives the weight of the ferric hypophosphite. With the same sample, after the details were ascertained, the following percentage figures were obtained: 97·56, 97·73 and 97·73.

With this sample similar results were arrived at in the following manner: 0·2 gm. ferric hypophosphite was dissolved in 3-5 cc. concentrated hydrochloric acid, 50 cc. water added, and heated in a water-bath for one-half hour; then add 75 cc. cold saturated solution of mercuric chloride and place in the water-bath for a further half-hour, etc., as in the previous description.

$Fe_2(H_2PO_2)_6$ requires for complete oxidation twelve oxygen atoms; one molecule of any ferric salt in its reduction to ferrous salt gives up one oxygen atom:

$$Fe_2(H_2PO_2)_6 + H_2O = 2Fe(H_2PO_2)_2 + 2H_3PO_2 + O$$

This oxygen, of course, is taken up by the hypophosphorous acid rendering it necessary to take up only eleven from the mercuric chloride; hence the weight of mercurous chloride obtained in this method must be increased by one-eleventh so as to express the hypophosphite present.

The results by this method will be high if the ferric salt be not completely reduced to ferrous salt. Working by the above directions the following percentage figures were obtained: 97·45, 97·60 and 97·56.

An estimation of the phosphoric acid yielded by oxidation with bromine (AMER. JOUR. PHARM., 1889, 330) and calculating to ferric hypophosphite indicated 97·73 per cent. of the latter in the salt examined.

From these determinations it appears that the alkaline citrate prevents the hypophosphorous acid from exerting any reducing action upon the ferric salt in the time necessary for making the assay; the important point to be observed is to first allow the greater part of the reduction to take place in the cold and then to finish by application of heat. The filtrate should always be tested by heating to the boiling point, to see if the reduction is complete.

In the *Journal of the Society of Chemical Industries*, 1891, 68, is an

abstracted article by L. Amat (from *Compt. Rend.*, 111, 676–679) on the estimation of the acids of phosphorus; the methods used are oxidation with potassium permanganate (agreeing with the one proposed by me excepting a slightly lower temperature) and the mercuric chloride method in which he recommends digestion at 80° C. for 12 hours; this method as described by me gives better results by digesting for one hour, or even less, at 100° C.; a decided saving of time with complete precipitation.

FERRIC SUCCINATE.[1]

By Prof. W. T. Wenzell.

Since succinic acid in combination with the ferric radical has recently been introduced by the medical profession, as a remedy for the relief of jaundice, resulting from obstruction of the biliary duct by calculi, and with apparent success, a demand for a preparation combining efficiency and elegance has arisen. The originator of this medicine recommends the use of the hydrated succinate of iron as the preparation by which he has obtained such good results in the treatment of the affection referred to. But the preparation is unsightly and anything but elegant as a pharmaceutical product.

Ferric succinate in a hydrated state or dried, appears as a cinnamon-brown, amorphous substance quite insoluble in water. It is readily prepared by adding to a solution in water of an alkaline succinate, a solution of ferric sulphate, as long as a precipitate is obtained. In this reaction the contrary to the law first enunciated by the Saxon chemist Wenzel a half a century ago occurs: "When two neutral salts are mixed together, in solution, and a decomposition is effected, the products of the decomposition would be also neutral salts." In this instance a basic ferric succinate is produced instead of a neutral succinate, a portion of the succinic acid being liberated and remaining in solution.

The reaction takes place between one molecule of ferric sulphate

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[1] Succinate of iron having again attracted some attention as a medicinal agent, we republish this paper which appeared in the Proceedings of the California Pharmceutical Society and College of Pharmacy for 1881. It was noticed in this Journal in June, 1881, p. 318, where the formula for the solution was republished.—Editor.

and three molecules of the neutral or normal ammonium succinate, and with the assimilation of two molecules of water.

$$\underset{\text{1 mol. Ferric Sulphate.}}{Fe_2(SO_4)_3} + \underset{\text{3 mol. Ammon. Succin.}}{3(NH_4)_2C_4H_4O_4} + 2H_2O =$$

$$\underset{\text{Ammonium Sulphate.}}{3(NH_4)_2SO_4} + \underset{\text{Basic Ferric Succinate.}}{Fe_2O_2H_2(C_4H_4O_4)_2} + \underset{\text{Succinic Acid.}}{H_2C_4H_4O_4}$$

Hydrated ferric succinate occurs in the form of an amorphous precipitate, containing one molecule of water of which it is deprived on drying and converted in the basic salt $Fe_2O(C_4H_4O_4)_2$.

The hydrated salt is insoluble in a cold solution of succinic acid or ammonium succinate, more soluble in boiling solution, from which it separates slowly on cooling; is more soluble in citric acid and very soluble in ammonium citrate, even at ordinary temperatures. A solution of ferric succinate in ammonium citrate is quite permanent and can be mixed with succinic acid and ammonia without decomposition. An excess of ammonia merely deepens the color. The solution evaporated at a temperature not to exceed 130° F. solidifies on cooling and standing for a time in a crystalline mass. By experimental synthesis, working with exact molecular weights it was found that three molecules of ammonium citrate were required to dissolve one molecule of the precipitated ferric succinate, and from these data the following composition of the double salt of ferric succinate and ammonium citrate has been deduced

$$Fe_2O(C_4H_4O_4)_2, 3(NH_4)_2C_6H_5O_7$$

and from this molecular formula a working formula for its preparation has been calculated.

Liquor Ferri et Ammonii Succinatis.—Dissolve 50 grains of succinic acid in 3 fluid ounces of water, neutralize nearly with ammonia and dilute to 6 fluid ounces. Transfer the solution to an 8-ounce bottle, add half a fluid ounce of the officinal liquor ferri persulphatis and agitate well. Transfer the mixture to a filter and wash the precipitated ferric succinate thoroughly with distilled water. Next take 89 grains of citric acid, put it into a beaker and add with stirring a sufficient quantity of ammonia water until the acid is dissolved and the solution neutral. Finally transfer the moist ferric succinate to a porcelain capsule, add the solution of ammonium citrate and dissolve, assisted by a gentle heat.

This solution, when diluted to measure 6 fluid ounces, will contain to the fluid drachm two grains of the ferric succinate $Fe_2O(C_4H_4O_4)_2$ or 5 grains of the double salt.

SAN FRANCISCO, Oct. 13, 1880.

ADDITIONAL NOTE ON SOLUTION OF SUCCINATE OF IRON.

BY F. W. HAUSSMANN, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

At the last meeting, attention was called to the dark color of the sample of ferrous succinate solution, furnished in connection with the paper on this subject. The suggestion was made that perhaps the ferrous carbonate employed was not entirely free from ferric salt, hence the dark color. In the preparation of the sample, the saccharated salt had been used, and, on examination of both the solution and the above salt, ferric iron was found to be present.

To determine if such influence produced the color mentioned, a solution was prepared with the employment of recently precipitated ferrous carbonate, care being taken to prevent the formation of ferric salt as much as possible. The color of both solutions was identical, and on examination of the recently-prepared solution, little or no ferric salt was found. Hence, it may be inferred that the dark color of the sample was not due to the presence of the ferric salt. Regarding the stability of the solution, it can be said that so far it has not shown any sign of decomposition.

The Ferric Solution.—The statement was made in connection with the solution prepared from ferric hydrate, that the preparation was of a ruby color. This color gradually changes to the one prepared directly from the salt, which is stated to be yellowish green. Neither of the solutions give any indication of much change, although a slight precipitate can be noticed in the one prepared from ferric hydrate.

Golden Sulphuret of Antimony is recommended by Dr. Th. G. Davis (*Med. News*, Feb. 7, 1891) in chronic bronchial catarrh or "winter cough." It should be given triturated with milk sugar in doses of from $\frac{1}{50}$ to $\frac{1}{30}$ of a grain after meals and at bedtime; it may be administered with other remedies to quiet cough and allay fever, for instance, with tincture of aconite $\frac{1}{5}$ minim, tincture of bryonia $\frac{1}{10}$ minim, and tincture of belladonna $\frac{1}{10}$ minim, and if cough is troublesome, either codeine or chlorodyne may be given on sugar at bedtime.

FORMULAS FOR SEVERAL PHARMACEUTICAL PREPARATIONS.

By George M. Beringer, Ph.G.

Read before the Philadelphia College of Pharmacy, at the Pharmaceutical Meeting, May 19.

ESSENCE OF PEPSIN.

A product very similar in appearance and chemical composition to the various proprietary preparations sold under this title can be made by the following process:

Take of

Fresh calves rennet,	4	troy ounces
Glycerin,	4	fluid ounces
Alcohol,	2	" "
Tincture of fresh orange peel,	2	" drachms
Water,	14	" ounces
Purified talc,	1	troy ounce

Mix the rennet and glycerin, then add the alcohol, water and tincture of orange, and macerate for four or five days, with repeated agitation. Add the talc, agitate and allow to stand for an hour, or until the talc has been largely deposited. Now decant on a muslin or flannel filter, the supernatant liquid first, and finally the dregs. Then filter again through paper.

One fluid drachm of the essence with four fluid ounces of water acidulated with hydrochloric acid will easily digest 300 grs. of egg albumen in four hours at 104° F., and one fluid drachm will curd one quart of milk at 100° F. in 4 minutes.

ELIXIR OF PEPSIN AND BISMUTH.

The National Formulary furnishes a formula for this preparation, in which 128 grains of pepsin are directed to be dissolved in 4 fluid ounces of water without the addition of any acid; although, in Elixir of Pepsin, hydrochloric acid is directed to be used to dissolve the pepsin.

J. U. Lloyd, in "Elixirs," page 141, recommends a formula for elixir of pepsin, in which 2 fluid drachms of acetic acid and 256 grs. of saccharated pepsin are used to the pint. Regarding the use of acetic acid, he says, that by substituting acetic acid for the acid usually employed (hydrochloric) we obtain a simple elixir of pepsin, more compatible with certain iron salts, and with

ammonio-citrate of bismuth. He publishes a formula for elixir of pepsin and bismuth, of which one-half is this elixir of pepsin and the other half elixir of bismuth, so that the finished product contains but one grain each of saccharated pepsin and ammonio-citrate of bismuth, which is certainly too weak in pepsin to insure any digestive value.

Mr. Lloyd, speaking of the *apparent* incompatibility of pepsin and bismuth and the value of substituting acetic acid for the hydrochloric acid in the preparation of the pepsin solution says: "Thus permitting it to be mixed with the bismuth solution without precipitation of bismuth and also the apparent solution of pepsin in the presence of ammonio-citrate of bismuth. We use the term '*apparent solution of pepsin*,' for although the pepsin undoubtedly disappears it does not necessarily follow that it dissolves and remains active pepsin. Perhaps it is so modified as to be devoid of digestive value, and still remain dissolved. Upon the other hand, even if this is the case, it is barely possible that such a pepsin is only paralyzed, and that its vitality will return when it is taken into the stomach."

As the result of some experiments tried in 1880, the writer was led to use citric acid as a solvent for the pepsin and in the last edition of Parrish's Treatise on Pharmacy such a formula is published. As the citrate of ammonium formed upon neutralizing with ammonia maintained the bismuth in solution, preventing the precipitate which usually soon forms in elixirs made with hydrochloric acid, it was considered a valuable improvement, and I have continued its use since. As the saccharated pepsin in the market has increased in strength during the past 10 years it became necessary to increase the amount of acid used. The following is the formula I would suggest:

Take of

Saccharated pepsin,	640 grains
Citric acid,	120 "
Bismuth ammonio-citrate,	128 "
Stronger white wine,	8 fluid ounces
Spirit of orange,	2 fluid drachms
Sugar,	4 troy ounces
Water of ammonia, Water,	of each a sufficient quantity.

Dissolve the citric acid in four fluid ounces of water and rub up the pepsin with this solution, add the wine and gently warm at a temperature of not over 100° F. until the pepsin is dissolved. Dissolve the ammonio-citrate of bismuth in 1 fluid ounce of water, with the aid of a few drops of ammonia water, and add this solution to the pepsin solution, and then gradually add ammonia water until the solution becomes perfectly clear and neutral or very slightly alkaline. Now add the sugar, spirit of orange and sufficient water to make one pint. Filter if necessary.

This preparation contains 5 grains of saccharated pepsin and 1 grain of ammonio-citrate of bismuth to the fluid drachm, which is the strength as supplied by most manufacturers. A few, however, claim 2 grains of bismuth salt to each teaspoonful, and the above formula can be so altered. In these days of strong pepsins, I would suggest that it should be made by substituting 128 grains of pure powdered pepsin for the saccharated of the formula. Sample marked No. 2 is thus made.

SOLUTION OF MALATE OF IRON.

A proprietary article on the market states on the label that each teaspoonful contains 4 grains of ferrous malate. Upon evaporation a fluid ounce yielded but 32 grains of total residue. The iron, being determined as ferric oxide, and calculated as ferrous malate yielded less than three grains of that salt. By the odor and taste spts. frumenti was easily recognized. The preparation appeared to closely resemble the tinctura ferri pomata of the German Pharmacopœia, with the substitution of common whiskey for the alcohol and cinnamon water of the officinal preparation.

As pure malic acid cannot be obtained at such a price as to warrant its use in preparing pharmaceutical preparations, we are compelled to depend upon the natural acid of certain fruits. As sour apples were not obtainable, it occurred to the writer that cranberries would form a suitable substitute. The juice of the cranberry is stated by E. Mach and K. Portele (see AMER. JOURN. OF PHAR., 1891, page 151) to contain from 18 to 20·5 per cent. of acid. The American cranberry possibly contains not as much acid. Experiment led to the following formula yielding a product very similar to the proprietary. One quart of soft cranberries yield about 12 fluid ounces of juice.

Take of

Cranberry juice,	14 fluid ounces
Iron in the form of fine wire and perfectly clean (card teeth),	1 ounce
Alcohol,	2 fluid ounces

The iron is added to the cranberry juice contained in a suitable vessel and set aside in a warm place, being occasionally agitated for several days. It is then boiled for a half to one hour, adding water from time to time to replace the amount evaporated. Filter and wash the filter with sufficient water to yield 14 fluid ounces of filtrate, add the alcohol and again filter if necessary. This yields a reddish liquid of a slightly acid, and not unpleasant, ferruginous taste.

SYRUP OF THE HYPOPHOSPHITES WITH IRON.

By F. W. Haussmann, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

At the last Pharmaceutical Meeting, in connection with the paper on Syrup roborans, the suggestion was made to replace the lactate of iron in the officinal syrup of the hypophosphites with iron by the hypophosphite. The pharmacopœial method is open to several objections, the chief ones being the incomplete solubility of the iron salt and consequent cloudy appearance of the syrup. More complete solution may be effected by triturating the lactate with the previously heated syrup, although this method is not without objection.

In the substitution of the hypophosphite for the lactate the slight solubility of that salt is the main disadvantage. A number of trials made, to effect simple solution in the officinal syrup of the hypophosphites were without result. Partial solution does take place, but insufficient to communicate an amount of iron, which may be deemed to have any decided virtue. The results are essentially the same, if either the officinal syrup or one containing free hypophosphorous acid in place of citric acid is employed. The pharmacopœial statement, that hypophosphite of iron is rendered more soluble in the presence of free hypophosphorous acid is only true to a limited extent and can hardly be taken advantage of in the preparation of the syrup. The same may be said if citric acid is substituted.

Freshly precipitated ferric hypophosphite is by far more soluble than the dry salt and by triturating it with boiling hot U. S. P. syrup of the hypophosphites an almost complete solution may be effected.

This is, however, not stable, as some of the iron will redeposit on cooling.

If in this operation in place of the officinal syrup one containing hypophosphorous acid is employed, solubility is less complete and the green color of the iron salt destroyed.

Simple solution not being possible, advantage was taken of the solvent action of citrates upon ferric hypophosphite. The following formula is based mainly upon the one given in the National Formulary for compound syrup of the hypophosphites and if carefully manipulated, will furnish a stable and attractive preparation:

Hypophosphite of calcium,	180 grs.
" sodium,	60 grs.
" potassium,	60 grs.
" iron,	48 grs.
Citrate of potassium,	50 grs.
Citric acid,	5 grs.
Granulated sugar,	6 oz.
Water, a sufficient quantity to make 8 ounces.	

Mix the hypophosphites of calcium, sodium and potassium and triturate with 3 ounces of water, adding the citric acid to effect complete solution of the calcium salt, and filter. To the filtrate, introduced into a bottle, add the sugar.

Dissolve the iron and the citrate in 6 drachms of water with the aid of heat, filter the resulting green solution and allow to cool. The perfectly cold solution is added to the contents of the bottle and the sugar dissolved by agitation. If it be desired, lemon spirit may added to flavor.

The iron solution must be perfectly cold or citrate of calcium is precipitated and the syrup rendered cloudy. It may also be stated, that freshly precipitated iron hypophosphite requires less potassium citrate for solution than the dry salt.

Thus prepared the syrup is of a yellowish green color and agreeable taste. It contains the same amount of iron as the officinal syrup and on two weeks' standing shows no change.

The ferrous salt of hypophosphorous acid is not stable, almost immediately changing to the ferric state when in solution.

On the following type, in which a solution of ferrous hypophosphite, prepared by double decomposition was employed, several trials were made to prepare a ferrous syrup, but the finished preparation rapidly decomposes.

Ferrous Sulphate in clear crystals,	64 grs.
Hypophosphite of calcium,	40 grs.

Dissolve the calcium and iron separately in one ounce of hot water, filter and allow to cool. Gradually mix the two solutions, stirring well, filter from the precipitated calcium sulphate, and add enough water through the filter to measure 3½ ounces.

In this dissolve

Hypophosphite of calcium,	180 grs.
" sodium,	60 grs.
" potassium,	60 grs.

Use 5 grains citric acid to dissolve all the lime, filter and dissolve the sugar by agitation. When freshly prepared, this is of a light green color and pleasant, ferruginous taste. If means could be found to stay the oxidation of the ferrous hypophosphite, the syrup, made by this method, would be no doubt a most satisfactory preparation. None of the methods used to prevent this result, such as the employment of heat or of free hypophosphorous acid, was however successful.

The prevention of this change, the addition necessary to gain this end, presents an interesting subject for future research.

POLARIZING WITHOUT A POLARIZER.

Editor AMERICAN JOURNAL OF PHARMACY.

SIR:—I can supplement the article of Dr. Van der Weyde (April number, p. 182) with the information, due to Mr. E. W. Sharp, of this city, that any glazed surface will polarize the light sufficiently for microscopical purposes, the differences observed being apparently due to the color of the reflector, black glass being undoubtedly the best. Incline your microscope as usual, convenient to you (the angle probably making very little difference), push aside (or remove) the mirror, and take the light directly from the reflecting surface, for instance, the polished top of a mahogany table—even a small

dish of water will do very well. Ordinary daylight is sufficient, although sunlight, of course, gives splendid effects, the same with lamplight.

Dr. Van der Weyde's black glass can easily be fitted (so as to be removed quickly) to the mirror-bar at a cost not to exceed one dollar; if parties are handy with tools they can do it for a few cents.

For the sake of convenience, I have fitted my analyzer to go over the eye-piece. A wooden ointment-box (not the cover), sufficiently large to just slip easily over the eye-piece, is provided with a hole in the bottom, which holds the analyzer rather tightly. This arrangement is very handy, when you, in the course of examination, want to find out whether the sections, crystals, etc., polarize at all, and then, whether it will be worth while to go to the trouble of "polarizing" in the regular way, all of which you can decide in a few seconds by merely putting the analyzer on top of the eye-piece.

Dr. Van der Weyde's remarks about the little knowledge of physics (natural philosophy) are unfortunately true. We pharmacists, as a class, are fairly well acquainted with a good many physical facts, but our *understanding* of them is lamentably deficient. We have learned somewhat to reason "chemically," but very few of us are able to lucidly explain a "physical" fact.

Yours respectfully,

HANS M. WILDER.

PHILADELPHIA, April, 1891.

A NEW TABLET MACHINE.

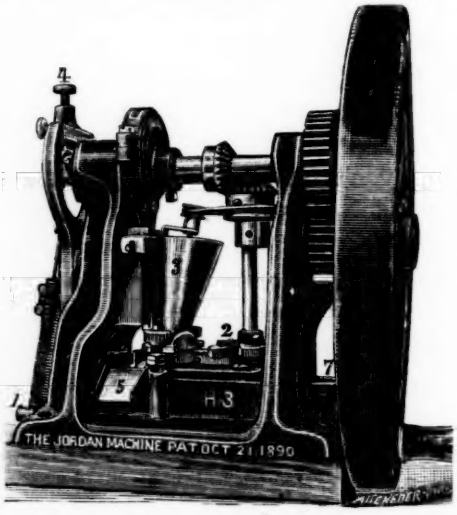
BY F. W. JORDAN, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

The large use made at the present time of compressed tablets induced the writer to endeavor to devise a machine which would enable the retail druggist to make tablets for prescription purposes, and which would be large enough to be used during his spare time in making tablets for replenishing his stock. Nearly all the machines which have heretofore been invented have been too large and too expensive for the use of the pharmacist, and the making of tablets has therefore been mostly confined to the manufacturers. Realizing that economy of space was a prime requisite in contriving a machine for the pharmacist, every effort was made to make it as compact as

possible, and yet strong enough in all its parts to be durable and powerful enough to resist a pressure equal to five times that required.

The arrangement of the machine is readily understood from the cut; it weighs sixty pounds, occupies a counter space of six by twelve inches and stands twelve inches high; the movements are positive and automatic, having an adjustment whereby the feed can be regulated to the $\frac{1}{56}$ part of a grain, and the pressure so as to make the tablets of any degree of hardness. The feed-can being nicely adjusted on the bed-plate prevents any waste of material, and is so shaped with an inside agitator that makes the feed so posi-



tive and regular that when the machine is set for a given number of tablets, the last one will be as accurate and perfect as the first one. The bed-plate moves but a short distance and carries the bottom die under the feed-can for supplies, and to the plunger, where the material is compressed and the tablet ejected. There are four sets of dies, made of the best steel, highly polished, producing tablets well shaped, and with edges perfect as possible to make them. The fly-wheel is of sufficient diameter to make its running easy to the operator. The machine is neat in appearance being ornamented with nickel trimmings, and nicely painted in brown and gold.

In conclusion, the writer ventures to express the hope that he has

been able to devise a machine which will furnish his brother pharmacists with a means of aiding his pecuniary advancement as well as developing his professional standing, by enabling him to improve his reputation amongst physicians by showing his ability to make his own preparations, rather than confining his energies to simply selling the productions of others.

TACONY, PHILADELPHIA, PA.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

IODOFORMATED GUAIACOL.—The mixture used by M. Picot in his new treatment of tuberculosis by hypodermic injections is formulated as follows in a communication (March 3), to the *Académie de Médecine:* The basis of the liquid is sterilized olive oil and vaselin; each cubic centimetre of this excipient should contain 1 cgm. of iodoform and 5 cgm. of guaiacol. The same mixture is used in cases of pleurisy.

IODOFORMATED GUAIACOL WITH EUCALYPTOL.—At a meeting of the *Académie de Médecine* (March 10), M. Pignol gave his formula for the hypodermic treatment of tuberculosis, as follows: Sterilized oil of sweet almonds, of which each ccm. should contain 14 cgm. of eucalyptol; 5 cgm. of guaiacol, and 1 cgm. of iodoform.

PREPARATION OF MAGNESIUM HYDRATE.—M. Fleury (*Répert. de Phar.* April 10), advises pharmacists to prepare their own hydrated magnesia, and to make it as follows: Boil the sulphate of magnesium with 10 or 12 times its weight of water, adding gradually, a 15 or 20 per cent. solution of caustic soda. Ebullition should be continued for twenty minutes after the liquor shall have acquired a strong alkaline reaction, and then it should be allowed to stand for two hours. The liquid is now decanted and the precipitate washed until the water ceases to give the reaction of sulphuric acid with acidulated chloride of barium. The hydrated magnesia is then dried at a moderate temperature.

FLUORIDE OF SILVER: ITS PREPARATION AND PROPERTIES.—M. Moissan stated at the meeting of March 10, of the *Société de Pharmacie*, that this salt is not, as has been supposed, difficult of preparation. It is only necessary to effect a reaction of hydrofluoric acid upon carbonate of silver which is pure and free from

oxide. The solution should be promptly evaporated in the dark chamber. Fluoride of silver reacts upon the chlorides of the metalloids by replacing their chlorine with fluorine. The chlorides of phosphorus, silicium and boron are thus transformed into fluorides. The same action is produced with the organic compounds of chlorine, iodine or bromine. Fluoride of silver fuses at 435° C.

SOLUTIONS OF BORIC ACID AND CORROSIVE SUBLIMATE.—M. Rousseau (*Soc. de Phar.*, March 10) had occasion to prepare a solution of the above in alcohol and water, using crystallized boric acid. He observed a deposit of red oxychloride of mercury which passed to a deep brown. On using boric acid in scales, no precipitate was given. He found that the crystallized acid contained traces of borate of sodium.

ETHEREAL PULVERIZATIONS OF CORROSIVE SUBLIMATE. — The formula, as used by Dr. Talamon in the treatment of erysipelas and variolic pustulæ, is as follows: Corrosive sublimate, and citric or tartaric acid, āā 1 gm.; alcohol of 90%, 5 ccm.; sulphuric ether, q. s. to make 100 ccm. One application frequently arrests the progress of erysipelas. After the temperature has gone down, two or three pulverizations may be made daily to insure a cure.

VINOUS LEMONADES.—The editor of the *Répert de Phar.* (April 10,) writes as follows: Some physicians prescribe vinous lemonade, and Dr. Dujardin-Beaumetz has lately recommended it in the treatment of typhoid fever, to promote diuresis. There is no formula in the Codex for this preparation. I give below some of the formulas in use: *Formula of the Paris Hospitals*: Red wine, 250 gm.; tartric syrup,[1] 60 gm.; water, 700 gm. *Formula of the Marine Hospitals*: Tartric lemonade, 900 gm.; red wine, 100 gm. *Formula of MM. Dujardin-Beaumetz and Yvon:* Citric lemonade, 750 gm.; red wine, 250 gm. Dr. Deschamp prefers white wines for this purpose. M. Lailler, pharmacist, proposes the following: Citric syrup, 60 gm.; red Bordeaux wine, 250 gm.; essencé of lemon, 1 gm.; water, 700 gm. It seems to us that the quantity of syrup above indicated is insufficient, also that tincture of lemon-peel should be used instead of the essence of lemon. So we propose the

[1] Tartric syrup contains 1 per cent. of tartaric acid; and tartric lemonade is made by mixing tartric syrup, 100 gm., with distilled water, 900 gm.—EDITOR.

following: Citric syrup, 100 gm.; red Bordeaux wine, 250 gm.; tincture of lemon-peel, 1 gm.; water, 650 gm.

STARCH TRANSFORMED TO DEXTRIN BY MEANS OF THE BUTYRIC FERMENT.—At the meeting of March 4, of the *Société de Pharmacie*, M. Villiers stated that the above transformation could be produced without the aid of diastase. To effect this he passes steam through a mixture of starch with water, places it in a glass container and adds the butyric ferment. The mass should be kept at a temperature of 104°. On the following morning the mass is found to have liquefied and the starch is converted into dextrin; no maltose is produced. As secondary products the liquid contains a small amount of butyric acid; also a crystallized body of the same centesimal composition as dextrin, and having a rotary power very similar to that of dextrin. After its action upon the starch the butyric ferment undergoes certain morphological modifications; its organisms have no longer the form of moving rods; they become immobile and are endowed, apparently, with a sort of head.

CHATININE, ALKALOID OF VALERIAN ROOT.—M. Waliszewski, a pharmacist of Clichy, has isolated an alkaloid from valerian and has named it chatinine, in honor of M. Chatin, late director of the *École de Pharmacie* of Paris. To obtain it, he removes from valerian root, by distillation, its valerianic acid and volatile products. Then he exhausts the root by decoction in distilled water, and clears the liquid with acetate of lead. The lead is eliminated by sulphuric acid or sulphuretted hydrogen. The filtered liquor is evaporated to the consistence of a soft extract, which is treated by 90 per cent. alcohol. The filtrate is distilled and the residuum is taken up with distilled water; this product is evaporated to the consistence of an extract and is treated with bicarbonate of soda and ether; the ether is washed with distilled water; the liquid is now evaporated and the residuum, which is chatinine, is treated by an acid, preferably hydrochloric. As valerian root contains an ammoniacal salt, which remains with the chatinine during the above operations, the product must be treated with 95 per cent. alcohol, in which the chloride of ammonium remains insoluble. The chatinine salts have the general characters of the alkaloids, and, like them, are precipitated by picric acid, bichloride of platinum, Valser's reagent, tannin, Bouchardat's reagent, etc.—*Union Phar.*, March 15; *Répert. de Phar.*, April 10.

GALEGA OFFICINALIS AS A GALACTAGOGUE.—Dr. Carron de la Carrière (*Jour. de Méd.*, April) has obtained results from the use of galega, which lead him to hope for its restoration to therapeutic use. He used the aqueous extract (equal to one-fifth of the weight of the dry plant), making it from the fresh plant. The extract has a pronounced odor, is very soluble in water, is incompletely so in alcohol, and is given in quantities of 1 to 4 gm. daily, in fractional doses of 50 cgm. to 1 gm.

. TOXIC ACTION OF NICKEL CARBONYL.—At the meeting of March 21, of the *Société de Biologie*, MM. Hanriot and Ch. Richet stated that 30 cgm. of this substance injected into the veins of a dog caused death in one hour. Larger injections caused immediate death. Instilled into the eye, it acts as a caustic, but does not produce immediate death; it seems to be difficult of absorption. Nickel carbonyl is not easy to handle, not so much because it is an explosive, for its explosions are neither violent nor dangerous, but because its vapor gives rise to severe headaches. It acts by displacing the oxygen of hæmoglobin. But it is not yet known whether the combination formed with hæmoglobin is one in which the oxide of carbon alone intervenes, or one in which the molecular group of nickel carbonyl, as a whole, is involved.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, Ph.G.

Chloral-phenol or chloral-carbolic acid is made by triturating equal weights of chloral hydrate and pure carbolic acid; it forms a colorless, viscid liquid, specific gravity at 20° C. = 1·289; it possesses prominently the odor of chloral hydrate, has a sweet, caustic taste and placed upon the skin produces irritation and blisters. It is readily miscible with alcohol, acetic acid, amylic alcohol, chloroform, carbon disulphide and ether; in the latter case considerable heat is developed; it is insoluble in petroleum ether Its alcoholic solution with strong sulphuric acid colors the latter beautifully red. Chloral-phenol, in small quantity, coagulates albumen; an excess again dissolves it.—E. Fabini, *Pharm. Post*, 1891, 261.

Aloins.—According to researches of Groenewold the aloins from Barbadoes and Curaçao aloes melt at 140° C. and probably have

the formula $C_{16}H_{16}O_7$; the aloin from Aloe hepatica Natal melts at 210° C. (with decomposition) and has the probable formula $C_{24}H_{26}O_{10}$. G. Balster finds that the first-two mentioned aloins are reliable laxatives, administered either in pill form (with extract of liquorice) or by subcutaneous injections (in formamide solution). Nataloin administered to dogs and cats is not reliable unless given in disproportionately large doses, with the addition of alkalies, however small doses will suffice; administered to man, nataloin, even with alkalies, is inactive except in such cases where only a meat-diet is followed. Aloin is always eliminated in the fæces, seldom in the urine.

For the detection of aloin, Klunge's cupraloin reaction (AM. JOURN. PHARM., 1890, 86) or a new piperidine test was used; the latter test will also distinguish between barbaloin and nataloin. The addition of a drop of piperidine to a nataloin solution produces a violet-red to a deep blue color, depending upon the quantity of nataloin; barbaloin in the same manner produces only a yellow color, by acidifying with acetic acid and agitation with acetic ether the latter will remove the yellow coloring matter (unchanged aloin), while the aqueous solution will show the violet-red color. These two tests succeed with 0·001 per cent. nataloin and 0·01 per cent. barbaloin.—(*Arch. f. exp. Path. u. Pharmakol.*) *Apotheker Ztg.*, 1891, 214.

Adulterated Carmine.—E. Donath, in examining commercial carmine, found one sample to consist of mixed lead oxide- and alumina-lakes of eosine with considerable lead sulphate, it was insoluble in ammonia; the aqueous extract showed the characteristic fluorescence of dilute eosine solutions. This sample was called "carmin ordinär," and had the appearance of an inferior product. A second sample, sold under the name of "carmin antik," could hardly be distinguished from genuine carmine; it was largely soluble in ammonia and consisted of the barium compound of red corallin, leaving nearly 75 per cent. barium carbonate upon ignition; such a preparation could be made by adding to barium chloride solution commercial red corallin dissolved in water, filtering and slowly drying the precipitate.—*Chemiker Ztg.*, 1891, 522.

Phthalic Acid is now made commercially by oxidizing naphthalene with a chromic acid mixture containing sodium chromate instead of potassium bichromate. The yield is a very satisfactory

one, from one kilo naphthalene more than one kilo phthalic acid is obtained. One molecule napthalene requires three molecules potassium bichromate and twelve molecules sulphuric acid, or six molecules sodium chromate and fifteen molecules sulphuric acid for oxidation.—Dr. H. Lüddens, *Chemiker Ztg.*, 1891, 585.

Tests to distinguish naphthalene, α-naphthol and β-naphthol.—If 0·1 gm. of these substances be added to 2·5 gm. chloral hydrate melted in a test tube they will dissolve; naphthalene colorless (this remains unchanged in the subsequent treatment) α- and β-naphthol pale yellow; the colors do not change by standing in the cold but placed in a water bath for two minutes only the α-naphthol changed to a red violet; heating for two minutes more the β-naphthol changes to blue green; heating longer in the water bath will cause an intense ruby red with α-naphthol, and with β-naphthol a pure blue color; these tests dissolve in an equal volume of alcohol giving colored solutions free from fluorescence.

II. If to the solution of these substances in chloral hydrate five drops hydrochloric acid were added α-naphthol became violet; heated in a water bath for two minutes α-naphthol became dark green-blue, β-naphthol intensely yellow; naphthalene with this test after 12 minutes' heating became very pale red.

III. If to II a small piece of zinc be added there will result with naphthalene a violet color changing to pale-brown; with α-naphthol a dark bluish-violet, diluting with water separates a coloring matter giving with alcohol a red-violet solution, fluorescing violet; with β-naphthol a dark brown color, diluting with water separates a substance giving with alcohol a yellow solution fluorescing blue.—L. Reuter, *Pharm. Ztg.*, 1891, 291.

Test for resorcin.—0·1 gm. resorcin is dissolved in 50 gm. potassium hydrate solution; upon warming a few cc. of this solution no change takes place, the addition of a few drops of chloroform or bromoform or better, a few crystals of chloral or bromal-hydrate, causes an intense ruby red color. This test was also tried with napthalene (remains unchanged, not being soluble as the alkaline hydrate solution), α-naphthol (dark blue changing to a greenish blue), and β-naphthol (transiently blue, passing into yellow).—L. Reuter, *Pharm. Ztg.*, 1891, 292.

Filicic Acid and Extract of Male-fern.—L. Reuter, examining a number of extracts of male-fern finds the filicic acid to be quite

variable in amount (from 0·3–0·7 per cent.); some of the extracts although quite efficient did not contain appreciable quantities of the acid. He quotes Dr. Poulson: "The crystallized filicic acid is absolutely inert; the amorphous acid is very poisonous and upon it depends the efficiency of the extract of male-fern." Prof. Kobert states the Russian extract is about ten times more powerful than the German, and twenty times more powerful than the French extract. 5 gm. of the Russian extract will produce dangerous poisoning-symptoms, while the German extract is given in five to eight grams doses, by Dr. Gerhardt, even 16 gms.—*Pharm. Ztg.*, 1891, 246.

Tonquinol, an artificial preparation of musk-like odor, is placed upon the market by Valentiner and Schwarz, of Leipzig; it forms a white crystalline powder mixed with needle-shaped crystals, and is stated to be made by nitrating a terpene and a xylol-sulphonic acid. The substance is especially recommended for soaps and perfumes; the alcoholic solution (1:50) can be diluted to any degree, differing in this respect from the artificial musk of Baur (Am. Journ. Pharm., 1890, 489). F. Eichbaum (in *Seifenfabrikant*, 1891, 154), speaks of tonquinol as not being altered in the least by exposure to air, light and alkalies; as being soluble in most solvents as fats, oils, ether, chloroform, etc. Compared with genuine musk and artificial musk Baur in price per kilo is stated: Genuine musk, $700, artificial musk $600 and tonquinol $450; in small quantities tonquinol sells at 50 cents per gram.—*Pharm. Ztg.*, 1891, 222.

Phenocollum hydrochloricum, a new antipyretic and anti-rheumatic manufactured by the Chemische Fabrik auf Actien (formerly E. Schering), is a phenacetine ($C_6H_4(OC_2H_5)NHC_2H_3O$) derivative in which the amido group (NH_2) is introduced into the acetyl radicle. It is made by action of glycocol (or amido-acetic acid CH_2NH_2COOH upon phenetidine $C_6H_4(OC_2H_5)NH_2$ one molecule of water splitting off. The compound is the hydrochlorate of amido-acet-para-phenetidine $C_6H_4(OC_2H_5)NHCH_2NH_2CO$. It is soluble in 16 parts of water at 17°C., forming a neutral solution; from boiling water it crystallizes in cubes, from alcohol in needles. The aqueous solution is precipitated by ammonium, potassium and sodium hydrates, and alkaline carbonates, the base separating with one molecule of water of crystallization; the anhydrous base melts at 100·5° C., the hydrous at 95°C. In doses of one gram it reduces fever-temperatures nearly

two degrees; in 0·5 to 1·0 gm. doses it is an excellent nervine and anti-neuralgic; the daily dose of 5· gms. gave relief in articular rheumatism after other remedies had failed. The only objection to or disadvantage of this remedy, according to Dr. Hertel, is its liability to decompose when in solution; this is noticeable in solution only two days old.—*Apotheker Ztg.*, 1891, 246.

Benzin.—Numerous complaints have been made of late regarding the difficulty in getting benzin which will stand the test for benzol (with nitric and sulphuric acids no odor resembling oil of bitter almonds should be noticeable). L. Reuter writing to Prof. Dr. C. Engler about the matter received in reply "that all crude oils, American or Caucasian, contain benzol (the former only in very small quantity) and that these oils carefully treated with sulphuric acid should be deprived of benzol." From another source was gleaned that much of the benzin of the German market was obtained as a side-product in the manufacture of compressed gas for railway coaches.—*Pharm. Ztg.*, 1891, 246 and 270.

Antikamnia, according to an analysis of Dr. Felix Goldmann, contains in one hundred parts: Sodium bicarbonate 22·2, acetanilide 67·4 and caffeine 9·8; it is very probably made by taking 20, 70 and 10 parts, respectively.—*Pharm. Ztg.*, 1891, 255.

Thiol-opodeldoc (5 per cent.). 70·0 dialyzed stearin soap and 20·0 dialyzed olein soap are dissolved with heat in 850·0 alcohol (90 per cent.), 2·0 oil of lavender added, filtered and the filtrate diluted to 900·0 by addition of alcohol. Mix in a warm capsule 50·0 each of liquid thiol and distilled water, pour this slowly into the soap solution, add 25·0 ether and pour into containers.—E. Dieterich, *Pharm. Centralhalle*, 1891, 176.

Extracts for writing inks.—The directions for use are: The contents of the package are placed in an earthen-ware vessel with 1¼ litres rain water and heated to slow boiling for 15 to 20 minutes; allow to cool, transfer to a bottle, allow to stand four weeks and decant into small vials.

60·0 tannin, 27·0 dry ferric sulphate, 10·0 gum arabic and 5·0 sugar, mixed in form of coarse powders, constitute the base: For *blue* ink add to the above 5·0 soluble aniline-blue I B; for *red*, 10·0 Ponceau R R; for *violet*, 4·0 Ponceau R R and 3·0 soluble aniline-blue I B; for *green*, 10·0 aniline-green D; for *blue-green*, 6·0 aniline-green D and 2·0 soluble aniline-blue I B; for *black*, 20·0 deep black

E. These extracts are to be put up in metal-boxes or glass bottles.

Extracts for copying inks.—For these the directions for use are the same as for writing inks; they differ only in being more concen trated when made. The following constitutes the base: 70·0 tannin, 30·0 dry ferric sulphate, 15·0 gum arabic and 10·0 sugar. For *blue* add to the above base 10·0 soluble aniline blue I B; for *red*, 10·0 Ponceau R R; for *violet*, 4·0 Ponceau R R and 6·0 soluble aniline-blue I B; for *green*, 10·0 aniline-green D; for *blue-green*, 7·0 aniline-green D and 3·0 soluble aniline-blue I B; for *black*, 20·0 deep black E; for an *alizarine* ink add 10·0 dry indigo-carmine (Indigotin).—E. Dieterich, *Pharm. Centralhalle*, 1891, 190.

Christia and Fibrine-Christia are English manufactures intended to replace gutta-percha paper, silk protective, etc.; christia is made by treating manila-fibres in such a manner as to make it insoluble, and impervious to water and alcohol; fibrine-christia is made by treating a silk-texture in the same manner. According to an examination of E. Dieterich the treatment to which the manila and silk is subjected is the application of a chromium-gelatin solution and exposing afterwards to sun-light. The following is the tabulated result of the analyses:

	Christia		Fibrine—Christia	
			I	II
	a.	b.	dense texture.	gauze.
Loss at 100° C. (moisture), ...	16·0	16·5	16·0	17·2
Water soluble (glycerin and salts),	29·0	29·0	26·5	30·0
leaving ash, ...	6·81	6·25	6·75	——
Insoluble chromium gelatin (dissolved in hot 30 per cent. acetic acid)	26·0	29·5	48·0	48·5
Remaining fibre	29·0	25·0	9·5	4·3

Dieterich states the following mixture spread upon both sides of imitated parchment paper will give an article handsomer in appearance than the *Christia:* 30·0 gelatin (or glue) are allowed to swell up in 200·0 water and then dissolved by heating to the boiling-point; add 30·0 glycerin 30° B. and lastly 3·0 finely powdered potassium bichromate. Exposure to sun-light reduces the bichromate, the yellow color changing to a dirty-green; this change is accompanied by another rendering the gelatin insoluble.—*Pharm. Centralhalle*, 1891, 193.

Creasote.—A. Reissmann made some experiments upon the best

method of preventing deterioration of creasote pills on exposure; he finds that of the several methods of protecting pills none is equal to putting the mass into capsules.—*Pharm. Centralhalle*, 1891, 203.

THE ALKALOIDS OF VERATRUM ALBUM.[1]

By G. Salzberger.

Prior to the year 1879 very little was known concerning the active constituents of the root of veratrum album. In 1819 Pelletier and Caventou assumed its active constituent to be veratrine, the alkaloid of cevadilla seeds. The researches of Maisch (1870) and Dragendorff (1872) tended to show that this assumption had no foundation in fact, as they both failed to find this principle.

Simon, in 1837, isolated a base, which he named jervine, and forty years later Tobien confirmed his work, at the same time stating that he had obtained an amorphous base, veratroidine.

In 1879, much more light was thrown upon the matter by the paper communicated to the Chemical Society by Wright and Luff. In order to properly appreciate their work, and to compare it with the results of Salzberger, a recapitulation of the chief facts is given. Wright and Luff succeeded in obtaining the jervine of Simon, and established for it a corrected formula ($C_{26}H_{37}NO_3$), besides which they found and analyzed two other crystalline alkaloids, rubijervine ($C_{26}H_{43}NO_2$) and pseudojervine ($C_{29}H_{43}NO_7$), together with an amorphous one, described as veratralbine. A small quantity of another base was detected, which, with veratralbine, acted as a powerful sternutatory. This, they thought, might probably be veratrine.

Salzberger began his investigations in 1855, with the view of discovering the active constituent of the drug. Jervine possessing only slightly toxic properties, and rubijervine and pseudojervine being absolutely inactive, it was reasonable to infer that the poisonous principle still remained to be found. In the course of his researches, in which 300 kilos of the rhizome have been used, he has obtained the three crystalline bases described by Wright and Luff, and two other crystalline alkaloids, which he has named *protoveratrine* and *protoveratridine*.

[1] Abstract from *Archiv der Pharmacie*, Band 228, p. 462; reprinted from *The Medical Chronicle*, April, 1891.

The former of these, protoveratrine, is extremely poisonous, as is shown by the statement that 0·5 mg. injected subcutaneously was sufficient to kill a full grown rabbit. When introduced into the nostrils in the most minute quantity it occasions violent sneezing. It can be removed from the powdered drug with cold water, but the solution will not yield it in the crystalline form. In the pure state it appears to be insoluble in water, and only soluble with difficulty in alcohol and ether. The formula ascribed to it is $C_{32}H_{51}NO_{11}$, and the author points out the similarity between this and the formula for veratrine, $C_{32}H_{49}NO_9$. He says, however, that they cannot be identical bodies, as not only do they differ in composition, but they differ in their behavior with reagents.

Two processes for the extraction of the alkaloids were used. By one of these jervine, rubijervine, pseudojervine and protoveratridine were obtained; while by the other protoveratrine, pseudojervine, a little jervine and rubijervine, but no protoveratridine. From this circumstance Salzberger is inclined to consider protoveratridine, as a decomposition product of protoveratrine, and this appears to be very probable from the fact that this latter body is very unstable.

For protoveratridine the formula $C_{26}H_{45}NO_8$ is proposed.

In addition to the examination of these two bodies an examination of Wright and Luff's alkaloids was undertaken, and it is satisfactory to find that their formulas are confirmed. Full details of the reactions, solubilities, ultimate analyses, etc., are given, and plates exhibiting the crystalline forms of protoveratrine, protoveratridine, jervine and rubijervine are appended to the paper.

NOTE ON COMMERCIAL OIL OF CITRONELLA.[1]

By John C. Umney, Pharmaceutical Chemist.

The more common Indian grass oils, known in trade as verbena, ginger-grass and citronella, the products, respectively, of *Andropogon citratus*, *A. Schœnanthus* and *A. Nardus* differ considerably in appearance. The first two are usually of a yellowish-brown color; the third varies, being sometimes yellow, at others emerald-green, the yellow oil generally becoming green on exposure to light.

[1] Read before the Pharmaceutical Society of Great Britain, at an evening meeting in London, April 8; reprinted from *Phar. Jour. and Trans.*, April 11, p. 922.

In order to determine on what the difference in color of this last and the change from yellow to green which takes place depend, eight samples of citronella oil were obtained from various sources, and a small quantity of each exposed to direct sunlight. Of this number five (A, B, C, F, G) were decidedly green before exposure, two (D and E) were yellow at first, but rapidly became green, whilst one (H) was yellow originally and underwent no change. The fact that the presence of copper has been shown (Guibourt and Histed) to be reason of the green color of commercial cajeput oil, led me to suspect the same contamination in the case of this oil. (Since writing this note my attention has been called to the fact that Kremers[1] mentions incidentally the presence of copper in a sample of this oil which he examined.)

250 cc. of the sample *a* was shaken with a dilute solution of ferrocyanide of potassium, when a rapid separation of a red precipitate took place, which, after washing with spirit to free it from traces of oil and then with water to remove any excess of potassium ferrocyanide, was proved to be ferrocyanide of copper. Examination was then made of all the samples, with the following results:

	Sp. gr. at 15° C.	Color.	Remarks.
A	·896	emerald green.	copper present.
B	·895	greenish.	"
C	·890	"	"
D	·887	yellow, becoming green.	"
E	·896	" " "	"
F	·896	emerald green.	"
G	·897	greenish.	"
H	·870	brownish-yellow.	copper entirely absent.

From the fact that only those samples which were green, or became so on exposure, contained copper, it appeared almost certain that the change in color might be due directly to the presence of that metal, which was readily proved by precipitating all the copper from the most markedly green sample, by treatment two or three times with solution of potassium ferrocyanide, when the oil became pale yellow in color. One portion of this oil was then

[1] "Proceedings American Pharmaceutical Association," 1887, p. 562.

exposed to sunlight for some days and a second to the heat of a water bath in an open porcelain dish for twelve hours without any change whatever in color taking place. A third portion of the oil was treated on a water bath for a few minutes in presence of a very small piece of copper foil, when the oil rapidly assumed its original green color, thus showing conclusively that the green coloration of the oil is due to the presence of a trace of copper, and that its removal causes the oil to assume its natural color, namely, yellow.

The green coloration of the oil was destroyed on heating to 50° C., and at a higher temperature an acid distillate was obtained which was proved after neutralization to consist principally of acetic acid. It seems possible, therefore, that the metal exists in combination with this acid, the change in color on exposure to light either depending on oxidation of an aldehyde present to acetic acid, or on the partial decomposition of an ester of acetic acid contained in the oil. Varying statements exist as to the specific gravity of pure citronella oil, for whilst Messrs. Schimmel state that it should not fall below ·895 at 15° C. (*Pharm. Journ.* [3], xx, 264), Dodge (*Pharm. Journ.* [3], xx, 855) assigns to it a gravity of ·877 at 16° C. It will be noticed that sample H, which contained no copper, was of lower specific gravity than the others, and fell considerably below the limit proposed by Messrs. Schimmel. This sample proved, on examination of its solubility in 80 per cent. spirit, to be adulterated with petroleum, as was readily proved by fractionation, and the absence of copper is probably due to its distillation in the earthen or iron stills, now only used by the poorer native distillers. The quantity of copper present, without doubt, derived from distillation in stills of that metal, is, of course, very minute, but it seems desirable to call attention to it, as pointing out that pale yellow, and not green, is the natural color of citronella oil.

ON THE ACTION OF SALTS OF CANTHARIDINIC ACID.[1]

By O. Liebreich.

This important communication of Professor Liebreich was read before the Berlin Medical Society on the 25th of February, and in the discussion which followed several well-known physicians recorded their experience of the effects produced by the treatment introduced by the Berlin professor.

[1] Abstract from *Therap. Monat.*, March, 1891; reprinted from *The Medical Chronicle*, April.

Although cantharides has been employed medicinally since the time of Hippocrates, and not unfrequently given internally, its powerful influence on the kidney has prevented its general employment. It has, however, been recommended in several ailments, and Liebreich points out that by Cazenave, Rayer, and other French dermatologists, the tincture has been employed in psoriasis and chronic eczema, in doses as high as sixty drops, without evil results.

A consideration of the influence exerted by cantharides on the tissues led Liebreich to the therapeutic employment of the drug which he now advocates.

If a dose of cantharides, only just sufficient to cause acute poisoning and death, be given to a rabbit, the kidney symptoms are not such as will account for death, but the animal dies after some hours from dyspnœa. Post mortem the kidneys are not hyperæmic, and there is only slight hyperæmia of the lungs, which, however, are increased in consistence, owing to a slight exudation, for the most part free from cells and not coagulating spontaneously. Acute lung œdema is not present. The exudation is not preceded by a change in the blood pressure or in the condition of the heart, and seems to resemble that observed after the application of cantharides to the skin, in that there is no preceding hyperæmia. Only if large doses be given does an exudation containing cells take the place of a simple serous exudation.

It may be assumed that cantharides has a special action on the capillaries, owing to the peculiar form of irritation it causes.

If the vessel walls are not in a normal condition they may be more susceptible to the irritant action of cantharides, and it seemed to Liebreich possible that in capillaries of decreased resistant power, such as may be present in diseased conditions, those changes might be produced by very small doses of cantharides, which in healthy tissues are only caused by large doses. Such lessened resistance might occur through the irritation connected with the presence of bacilli. Koch's investigation into the action of tuberculin have shown that extremely minute quantities of a substance may cause changes in irritated tissues without acting on the healthy tissues. Whether cantharides could have such an effect or not seemed worthy of investigation. But for this investigation tincture of cantharides would not suffice, since it is not of a uniform strength, the amount of the chief active principle, cantharidin, contained in can-

tharides varying from ·3 to ·6 per cent.; Liebreich, therefore, determined to employ the active principle itself.

The exact constitution of cantharidin ($C_{10}H_{12}O_4$) has not been determined, but of the oxygen atoms contained there is reason for believing that three of the atoms are contained in the group CO and COOH.

Many derivatives have been obtained from it, as for example:

Cantharidinic acid,	$C_{10}H_{14}O_5$
Cantharidoxim,	$C_{10}H_{13}NO_4$
Cantharidoximic acid,	$C_{10}H_{15}NO_5$
Cantharic acid,	$C_{10}H_{12}O_4$
Cantharoximic acid,	$C_{10}H_{13}NO_4$

To avoid complications arising from the irritant action of cantharidin on the stomach and intestines, it seemed desirable to inject it subcutaneously. But cantharidin is not soluble in water, though dissolved by ether and oils. Cornil has used, in experiments on animals, a solution in acetic ether, and Aufrecht a solution in oil; but the former solvent is irritating, whilst the oily solution is not adapted to subcutaneous injection. Cantharidin can also be dissolved in caustic potash and soda, being at the same time in part converted into cantharidinate of the alkali.

Cornil had stated that the potash solution causes suppuration, but Liebreich found that this was due to the excess of alkali used, and that by employing the smallest amount of alkali which would dissolve the cantharidin, a satisfactory material was obtained for subcutaneous use. He commenced the use of cantharidin dissolved in potash by giving $\frac{1}{50}$ of a milligramme ($\frac{1}{3500}$ grain), which caused neither pain nor redness at the point of injection, and gradually increased the dose, but found it could not be raised higher than $\frac{6}{10}$ of a milligramme ($\frac{1}{120}$ grain) without producing urinary troubles.

On injecting a series of tubercular laryngitis with a solution of cantharidin in caustic potash, such distinct improvement was observed that Liebreich thinks there can be no doubt of the curative influence of the drug, though further clinical observations are required to determine the limits of its value.

On an average a solution of 1 cc., containing $\frac{2}{10}$ of a milligramme ($\frac{1}{350}$ gr.) of cantharidin was injected into the back. No febrile reaction or redness of the affected part was observed.

He advises that should diarrhœa or a burning feeling of the

urinary passages occur the dose should be decreased by half. A few drops of tincture of opium suffice to remove any sensation of discomfort which the drug causes. He thinks that probably one to half decimilligramme ($\frac{1}{700}$ to $\frac{1}{1400}$ gr.) will, in most cases, be found sufficient, and the injection should be given every other day.

So far the experiments have been chiefly made in cases of tubercular disease of the larynx, and catarrhal swelling of the vocal cords.

The extraordinary quickness with which the drug acts on tubercular swelling of the larynx leads him to the opinion that the exudation so increases the nutrition of the tissue elements that it produces healing either by causing normal proliferation, notwithstanding the presence of bacteria, or by removing the injurious effect of the bacteria. Probably the exudation of the blood serum possesses the property of killing bacteria. There seems reason for believing that blood serum is destructive to bacteria, and that the action of cantharidin is capable of producing the same effect as transfusion with blood serum. Liebreich suggests that substances allied to cantharidin, and produced from it, as canthro-oxide and cantharene, should be further examined.

When cantharidin is dissolved in potash or soda, a pure cantharidinate is not produced, a variable amount of cantharidin being mixed with it. Hence cantharidinate of potash and soda could not hitherto be used in exact doses.

To prepare a cantharidin solution for injection, Liebreich mixer ·2 grammes of cantharidin and ·4 grammes of potash, dry, and free from carbonic acid, and most carefully weighed; this should be placed in a 1,000 cc. measure with 20 cc. of water, and warmed in a bath until the solution becomes clear; then, whilst the application of heat is continued, water should be added to 1,000 cc.. Instead of potash ·3 grammes of hydrate of soda may be used. Each cc. of the solution (18 minims) contains $\frac{2}{10}$ of a milligramme of cantharidin

CHOLESTEROL.[1]

By K. Obermüller.

Two formulas, $C_{26}H_{44}O$ and $C_{27}H_{46}O$ (Reinitzer, 1888) have been ascribed to cholesterol (cholesterin). The chief object of the present research was, by the analysis of certain cholesterol compounds, to determine which is the correct one. The general result

[1] *Zeit. physiol. Chem.*, **15**, 37—48; reprinted from *Jour. Chem. Soc.*, 1891, p. 298.

of the analysis is that Reinitzer's formula is correct. The following compounds were prepared:

Potassium cholesteroxide, $C_{27}H_{45}OK$, was prepared by placing potassium in an ethereal solution of cholesterol. It agrees in all its properties with Reinitzer's sodium cholesteroxide.

Cholesteryl propionate, $C_{27}H_{45}.C_3H_5O_2$, was prepared by heating a mixture of cholesterol with propionic anhydride on the water-bath for half-an-hour; on cooling, it sets to a fatty mass; this is extracted with ether, and the propionate precipitated from the extract by alcohol in the form of rhombic plates; melting point 98°. It is easily soluble in ether, benzene, and carbon bisulphide, sparingly soluble in alcohol. After fusion, there is, on cooling, a play of colors observed, blue, green, orange, and red, in the order named, by reflected light; the complementary colors are seen by transmitted light. In order to use this reaction as a test for cholesterol, the latter must first be obtained in a pure condition; it may be most readily freed from the fats with which it is usually mixed by the method of saponification.

Cholesteryl benzoate, $C_{27}H_{45}C_7H_5O_2$. This is best prepared by the action of benzoic chloride on cholesterol; and this preparation may be used for the quantitative estimation of cholesterol. The crystals are plates which show two melting points, namely, 145° and 178°. A compound with similar properties was prepared from isocholesterol.

Cholesteryl phthalate, $C_6H_4(COO\text{-}C_{27}H_{45})_2$, was prepared by heating phthalic anhydride and cholesterol at 180°, and crystals obtained by the addition of alcohol to a hot ethereal solution. It is sparingly soluble in cold ether; melting point 18–25°.

Cholesteryl benzyl ether, $C_{27}H_{45}\cdot O\cdot C_7H_7$, prepared by heating sodium cholesteroxide and benzyl chloride at 100°, was crystallized from an acoholic-ethereal solution in thin plates melting at 78°.

Cholesteryl propionate dibromide, $C_{27}H_{45}Br_2\cdot C_3H_5O_2$. This additive product is similar to that prepared previously by Wislicenus and Moldenbauer. $C_{27}H_{46}Br_2O$ (*Annalen*, **146**, 178), by the action of bromine dissolved in carbon bisulphide on pure cholesterol, and to that prepared by Reinitzer (*Wiener Monatsh.*, 1888, Heft 5), by the action of bromine on cholesteryl acetate. This substance is important, as the relation between carbon and bromine gives a key to the formula of cholesterol. *Cholesteryl bromobenzoate*, $C_7H_4BrO_2$., $C_{27}H_{45}$, was also prepared and analyzed.

NOTES ON ESSENTIAL OILS.

By Geo. M. Beringer, Ph.G.

Abstracted from the Semi-annual Report of Schimmel & Co.

Bitter Almond Oil.—In the preceding semi-annual report, Messrs. Schimmel & Co. called attention to the fact that the artificial benzaldehyde of commerce prepared from benzyl chloride is always more or less contaminated with chlorine compounds, and proposed tests for this element as a means of detecting adulteration. (See Amer. Journ. Pharmacy, 1891, p. 43). E. Merck has recently stated that genuine bitter almond oil is not always free from chlorine compounds, and has recently placed on his list an ol. amygdal. amarum verum containing chlorine. The same manufacturer also claims to make and quotes on his price-list a purified benzaldehyde free from chlorine. As a result of their examination of this latter product, Messrs. Schimmel & Co. state that it is not chlorine free, its chlorine being readily detected by the combustion method.[1]

The assertion that pure bitter almond oil may contain chlorine is less easily refuted, as nothing is vouchsafed as to the preparation of such an oil or as to the nature of the chlorine compounds contained therein. Messrs. Schimmel state that in the course of the last 15 years they have worked many thousand hundredweight of almonds, of peach and apricot kernels of the most varied kinds, but never have been able to detect in it any chlorine, although for more than 8 years they have carried out the relative investigations with great regularity (as control estimations in the testing of doubtful oils of commerce). The chlorine compounds in bitter almond oil could be of various nature ; either *organic* compounds, benzyl chloride, mono- and dichlorine *substitution products* of benzaldehyde and of benzyl alcohol, etc., or minute traces of *inorganic chlorides* (chloride of sodium and of calcium) which would originate from the process of rendering the oil anhydrous. Chlorine compounds of the latter kind are not detected by the combustion method, but would be shown by the process of testing recommended by Heppe.

Chlorination substitution products may be detected by the following method. A small quantity of the oil is oxidized with a warm alkaline solution of potassium permanganate, excess of the latter decomposed by the addition of a few drops of alcohol, the whole filtered and the filtrate acidified with diluted pure H_2SO_4. After complete cooling has taken place, the separated benzoic acid—which contains the organic chlorine compounds (with the exception of any benzylchloride), in the form of chlorinated benzoic acid—is thrown on a filter and carefully washed. Large quantities of chlorine in the filtrate indicate the presence of organic chlorides in the oil. The benzoic acid is dissolved in pure potash solution, a little nitre added, the solution evaporated to dryness and finally heated in a platinum dish. The residue of incineration is taken up by water, acidified with nitric acid, filtered and tested for chlorine.

Organic Chlorides (benzylchloride) can be detected as follows,—5 to 10 grms.

[1] Since the publication of this method (see Amer. Journ. Pharmacy, 1891, p. 43), I have had occasion to examine a number of samples of commercial oil of bitter almonds and made careful tests with this method with entire satisfaction. Certain samples of undoubted purity as, for instance, "Allen's," gave no reaction for chlorine, while a known sample of synthetic gave a copious reaction, and mixtures of the two could be easily detected.—G. M. B.

of oil are heated to boiling in a distillation flask and the first 10–12 drops of the distillate caught in a 5 per cent. alcoholic potash solution.[1] The liquid is heated for a time under a return condenser, then the alcohol is volatilized, the residue treated with water and the oily constituents (benzyl alcohol, etc.) shaken out with ether. The aqueous liquid is warmed, acidified with HNO_3, filtered when perfectly cooled from the separated benzoic acid, and the filtrate tested for chlorine.

A sample of the *Ol. amygd: ver., chlorine containing*, obtained from E. Merck, showed on application of the combustion method a strong chlorine reaction. Special testing, in the manner described above, showed that *both organic chlorides and the chlorine substitution products named were present.* Thereby indubitable proof is afforded that artificial benzaldehyde from toluol is contained in it, for no one will seriously assert that the chlorine compounds named will originate in the distillation of almonds or kernels.

Angelica Root Oil.—The pronounced odor of phellandrene in the oil distilled from fresh root indicated the presence of this hydrocarbon. The constituents boiling at 178° C. were fractionated and readily gave, with nitrite of sodium and glacial acetic acid, large quantities of a solid nitrite, the identity of which was established by the melting point of the recrystallized substance. The chloroformic solution of the nitrite turned the ray of polarized light to the left. As now the rotation of phellandrene is known to be the reverse of that of the nitrite prepared from it, the hydrocarbon contained in angelica oil is dextro-phellandrene. Its presence was also detected in oil of the seed.

Anethol.—Anethol is characterized by the following properties: (1) An exquisitely fine pure anise taste. (2) Perfect colorlessness. (3) A sp. gr. of 0·985 at 25° C. (4) A constant boiling point at 234° C. (5) A melting point between 21° and 22° C.

Bergamot Oil.—Pure Bergamot oil may be regarded as a rarity in commerce. The most usual adulterants are lemon, sweet orange and turpentine oils; sophistication with lemon oil is just now the special order of the day. A machine pressed oil is especially prepared for this purpose and is an exceedingly dangerous adulterant. In order to provide means of detecting these adulterants, comparative examinations were made of absolutely pure oils pressed by themselves, commercial oils and various mixtures prepared from known oils. The following three factors are stated to give reliable indications: (1) The specific gravity. (2) The rotary power. (3) The solubility in spirits of wine.

For bergamot oil these factors are stated to be sp. gr. 0·881* to 0·885; rotatory power (100 mm.) + 8° 30′ to + 19° 30′.

For orange oil sp. gr. 0·849 to 0·855; rotary power (100 mm.) + 97° 2′ to 97° 4′.

For lemon oil sp. gr. 0·857 to 0·863; rotary power (100 mm.) + 40° 10′ to + 62°.

Pure bergamot oils form clear solutions at 20° C. with ½ part of 90 per cent.

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[1] Benzyl chloride boils at 176° C. Benzaldehyde at 179°. The monochlor-benzaldehydes boil between 212° and 215° C.

* The United States Pharmacopœia gives the sp. gr. as 0·860 to 0·890. My own observations indicate that this range can be reduced and led me to adopt as a standard 0·880.—G. M. B.

(vol.) alcohol which are not rendered turbid by further addition of alcohol of same strength. Neither sweet orange oil nor lemon oil form clear solutions under the same conditions. Adulteration with oil of turpentine is rare and can be mostly detected by smell alone. Oil so admixed has also a lower sp. gr. and yields abnormally large proportions of low (160° C.) boiling fractions (Pinene). Additions of fatty oils are recognized by the higher specific gravity of the specimens and by the residue which they leave when volatilized at 100° C. Half a drachm evaporated on a watch glass at 100° until the odor has completely disappeared leaves about 6 per cent. of a green homogeneous ointment-like residue. In case of adulteration with fat oils there is an increased residue with a supernatant oily yellow liquid.

Birch Tar Oil.—The rectified oil is much weaker in aroma than the crude and the latter is recommended where the color is not a disadvantage. The phenols contained in this oil, according to Max Pfrenger (Archiv f. Pharm., 1890, p. 713) consisted chiefly of guaiacol and creosol; there was also present a small proportion of cresol, and xylenol and traces of phenol. The phenols are the same as exist in beech wood tar.

Buchu-leaf Oil.—Long buchu leaves (Barosma serratifolia, Willd.) gave 1 per cent. of essential oil sp. gr. 0·944 containing only a small quantity of diosphenol (buchu-camphor.) Round buchu leaves (Barosma betulina, Bartl.) yielded 2 per cent. of oil, which even at the normal temperature was quite filled with crystals of diosphenol.

Citronella Oil.—The shipments from Colombo and Galle in 1890, amounted to 12,820,315 oz. Cintronellon, which is found in this oil and in the essential oil of the leaves of Eucalyptus dealbata and E. maculata has been recently examined by F. W. Semmler (Berichte der Deutschen Chem. Ges., xxiv, 209.) By oxidation with oxide of silver a liquid acid, citronellic acid $C_{10}H_{18}O_2$, was obtained. This decides the aldehyde character of citronellon.

Coriander Oil.—The oil contains about 90 per cent. of coriandrol $C_{10}H_{18}O$ boiling between 194° and 198° C., optically dextrogyrate, sp. gr. 0·8679 at 20° C.

Cubeb Oil.—The export of cubebs from Java has enormously increased. In 1889, the weight exported was 66,840 kilos against 8,880 kilos in 1888. Within the year, prices have fallen 35 to 40 per cent. A note from Ceylon appears in the *Tropical Agriculturist*, according to which the plants in the Peradeniya Gardens have become quite acclimated, and it is hoped that it will soon be possible to place sufficient material at the disposal of the intelligent planters of the island.

Eucalyptus Oil.—The oil from Eucalyptus oleosa, an Australian species, is stated to be so extraordinarily rich in Eucalyptol, that in a freezing mixture it solidifies to a pasty mass. This new oil has a sp. gr. 0·923 at 15·5° C., 72 per cent. boiling between 170° and 180° C., and is comparatively free from the lighter constituents. Cumin-aldehyd is also present.

Kuro-moji Oil.—An oil distilled from the wood of Lindera sericea introduced into perfumery. It is stated to have a sp. gr. at 18° C. of 0·901 and a lævorotatory power of 4°. Two different terpenes were detected *dextrolimonene* and *dipentene*. Of oxygenated bodies, *terpineol* and lævo-carvol were found.

Linaloe Oil.—The consumption of this oil has largely increased, it being used in conjunction with cananga oil in the so-called lily-of-the-valley perfumes. It is exclusively distilled by the Indians in the state of Guerrero, Mexico.[1]

According to Semmler (*Ber. d. Deutsch. Chem. Ges.*, 1891, 207) the chief constituent of linaloe oil is *linalool* $C_{10}H_{18}O$, boiling between 190 and 195° C., and in a tube 100 mm. turns the ray of polarized light to the left 3° 10′; sp. gr. at 20° C. is 0·8821.

Pennyroyal Oil.—According to E. Beckmann and M. Pleissner (*Liebig's Annalen*, 262, p. 1), *pulegon*, a body of the formula $C_{10}H_{16}O$, is most abundantly contained in Spanish, and in smaller quantity in American and Algerian pulegium oil. It boils under a pressure of 60 mm. at 130–131°, turns a ray of polarized light to the right and has a sp. gr. at 20° of 0·9323. It behaves chemically like a ketone forming with hydroxylamine an oxime, viz: pulegonoxime $C_{10}H_{19}NO_2$ crystallizing in beautiful needles, m. p. 157° C. With HBr it forms pulegon hydrobromide, a crystalline compound, m. p. 40·5°, and very suitable for its identification. By reduction with sodium in an ethereal solution it yields menthol.

Rosemary Oil.—Pure rosemary oil answers to the following requirements: sp. gr. 0·900 or never lower than 0·890; dissolves at 20° C. in ½ to 1½ parts of 90 per cent. alcohol, the solution remaining clear on further addition of alcohol; it is dextrogyrate.

Sandalwood Oils.—Some Australian sandalwood oil, recently sold at auction in London, although labelled Ol. Santal. flav. pur., proved to be a distillate from the cheap Swan River sandalwood. This oil is distinguished from the East Indian sandal oil by its sharp odor and specific gravity, the West Australian oil being 0·953, while the Indian is 0·978.

African Sandalwood Oil.—A brown-red wood, uncommonly hard, received from Madagascar, the botanical origin of which is unknown, yielded 3 per cent. of a ruby-red oil, sp. gr. 0·969, and consistence of East Indian oil. Odor is not promising and will probably be of no value.

South Australian Sandalwood Oil.—A distillate from the wood of *Santalum Preissii*, a tree growing in South Australia. The wood is dark brown, light texture, hard and heavy, and distinctly different from the Swan River Santalum cignorum. It yielded 5 per cent. of a viscid cherry-red oil, sp. gr. at 15° C. being 1·022. This oil possesses the peculiar property of solidifying at medium temperatures and separating acicular crystals. This phenomenon occurs

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[1] For the botanical origin and composition of oil of lignaloe, see AMER. JOURNAL OF PHARMACY, 1887, p. 449. From the variableness of the commercial article, I have very little doubt that several of the numerous Mexican species of Bursera are distilled and the oil sent into commerce indiscriminately under this name. From my notes, I abstract the following regarding two samples of oil examined: No. 1 purporting to be distilled in the United States from imported wood; sp. gr. 0·950, pleasant aromatic jasmin-like odor; freely soluble in alcohol of 90 per cent. and 85 per cent., and in an equal volume of 80 per cent., soluble in 2 volumes 60 per cent., 7 volumes 50 per cent. and 40 volumes 40 per cent. With iodine it yields a brown solution without fumes. No. 2, from a German house, odor less aromatic, slightly terebinthinate, sp. gr. 0.8807; very soluble in alcohol of 90 per cent. and 85 per cent. and in equal volume of 80 per cent., but required 100 volumes of 60 per cent. for complete solution; with iodine it gives slight fumes and a bluish residue.—G. M. B.

especially in the middle fractures of the oil, and some of these possess a peculiar balsamic odor with a suggestion of rose.

Citral.—J. W. Semmler (*Ber. d. Deutsch. Chem. Ges.*, 1890, 3556, and 1891, 203) found that the aldehyde $C_{10}H_{16}O$ obtained by the oxidation of geraniol with chromic acid mixture is identical with citral. By further oxidation with argentic oxide he obtained *geranic* acid $C_{10}H_{16}O_2$, a limpid oil. On treating citral with potassium acid sulphate cymol was formed. Up to the present time citral has been found in the following oils: Lemon, limetta (Citrus Limetta), Mandarine (Citrus Madurensis, Linn.), Lemongrass (Andropogon citratus), Eucalyptus (Eucalyptus Staigeriana), Backhausia (Backhausia citriodora), Citronella fruit oil (Tetranthera citrata, N.), Japan pepper oil (Xanthoxylum piperitum).

MINUTES OF THE PHARMACEUTICAL MEETING.

May 19, 1891.

The eighth and last of the present series of meetings was held to-day; Mr. Wm. B. Webb occupied the chair, and in the absence of Mr. T. S. Wiegand (through sickness) F. X. Moerk acted as secretary.

The minutes of the last meeting were read and approved. G. M. Beringer, Ph.G., communicated several formulas: "On Essence of Pepsin" (intended to replace the numerous glycerin solutions now flooding the market); "On Elixir of Pepsin and Bismuth." Inquiry elicited the statement that neither of these preparations had a digestive action corresponding to the amount of pepsin used in their manufacture. Mr. Webb stated that years ago he had made a wine rennet which was largely prescribed under the name of *vinum coagulum*. A third formula was for a "Solution of Malate of Iron;" Mr. Webb said he had been informed that a large manufacturer used for some years past cranberry juice in making this preparation. Prof. Maisch suggested that experiments be made with our *mountain ash berries* as the fruit of the European *Sorbus Aucuparia* contains malic acid with very little of other organic acids; another source for malic acid was sumach berries. A question as to the superiority of this salt over other organic salts of iron was answered that it had been a favorite as a mild ferruginous preparation, but was not much used at present because of its indefinite composition. The evolution of *Bitter Wine of Iron* was mentioned, it having been made first from metallic iron by dissolving it in *hard* cider; then iron, orange juice and wine were used and this superseded by the bitter wine of iron.

F. W. Haussmann, Ph.G., read some notes supplementary to his paper of last month on the Solution of Succinate of Iron. Prof. Maisch stated that a formula for this preparation had been published ten years ago and that he contemplated republishing Prof. Wenzell's paper in the AMERICAN JOURNAL OF PHARMACY. A paper on an *Improved Syrup of Hypophosphites with Iron*, by Mr. Haussmann, confirms the properties of ferric hypophosphite as published in the AM. JOURN. PHARM., 1889, 392. Mr. McIntyre obtained best results by adding to solution of calcium hypophosphite acidified with hypophosphorous acid, the solution of ferrous sulphate; in this way the syrup containing ferrous hypophosphite could be kept for several weeks without precipitation; the composition of the precipitate has not been ascertained.

"*The Assay of Ferric Hypophosphite,*" by Frank X. Moerk, supplemented some work previously published.

In reference to the question, "What should be dispensed when *naphthol*, simply, is prescribed? the answer was given *Beta-naphthol.* The statement was made that *Hydro-naphthol* has been published to be only an impure naphthol, the solubility and melting points of the two agreeing; a controversy on this identity had been carried on in several New York journals a few years ago.

The question as to the displacement of natural by *synthetic carbolic acid* was answered by the announcement that as the synthetic acid had no superior medicinal action over the natural acid and as they both reddened upon exposure, and in addition the synthetic was much more expensive, it was very little, if at all, used at present. The preparation of synthetic carbolic acid was referred to Mr. Beringer.

A paper on "*Geranium maculatum,*" by Prof. H. Trimble and J. C. Peacock, Ph.G., was read by the former; in answer to a query by Prof. Maisch as to the percentage of tannin in the drug after drying, Prof. Trimble stated that such a determination had not been made in this work, but, judging from the results of H. J. Meyers, Ph.G., who examined the air-dried roots and found only about one per cent. gallic acid, there could be but little difference due to decomposition in drying the roots.

An *Improved Compressed Tablet Machine* was described by F. W. Jordan, Ph.G., of Tacony, Phila., and also shown in working order.

In answer to the inquiry regarding the composition of the *commercial acid sulphate of quinine,* Mr. Frank H. Rosengarten replied by letter that two definite sulphates—the neutral and the acid—are known; whether the commercial acid sulphate is a pure definite chemical compound is a hard question to answer, as the determination of the purity of quinine sulphates is a difficult problem, few chemists agreeing on the results.

All of the papers were referred for publication.

The following report of the Committee having in charge the Pharmaceutical Meetings, was read:

To the members of the Philadelphia College of Pharmacy:

GENTLEMEN:—Your committee, appointed at the Pharmaceutical Meeting in December, in whose charge the remaining meetings of the present series were placed would respectfully submit the following report:

When the meeting, in December last, was held, there was but a slim attendance, and not a single paper was presented, the meeting resulting in but a desultory discussion of a few topics suggested by the members present. This was but a logical result of the "go-as-you-please" method with no one in charge, with which these meetings had been conducted. It was suggested that an attempt should be made to popularize these meetings; to have a programme outlined in advance and to make them a source of valuable information both of practical experiences and of scientific knowledge.

With this object in view this committee was appointed and they have labored to attain the desired end.

A circular describing the objects of and the benefits to be derived from these meetings was prepared and distributed with the announcement for the meeting in January. Pharmacists and students were requested to submit, for the con-

sideration of the meetings, queries, observations resulting from practical experience, such as prescription difficulties, formulas or other topics of interest. These circulars inviting the pharmacists to take part in the meetings were sent to every member of the College and to members of the fraternity in the city, and this has been continued through the remaining meetings of the series.

As a result of this effort 21 queries have been submitted, 15 of which have been accepted and have been answered; several others, although accepted, are yet unanswered. At least 8 papers of more or less value elicited by these queries have already been published in the journal.

Another feature introduced by the committee was the introduction of topics for popular discussion. This feature was apparently well received, and even such a thread-bare subject as the ownership of the prescription elicited a stirring discussion.

The increased attendance at the later meetings has been noticeable, and the committee see no reason why a continuation of the effort to popularize and improve them should not result in a large attendance, and the meetings obtain that recognition which they deserve.

The value of these meetings to pharmacists and to the College, as part of its educational system, cannot be overestimated. Especially have they proven a valuable adjunct to the journal, supplying the editor with a goodly number of the original contributions for which the AMERICAN JOURNAL OF PHARMACY is noted.

In conclusion, the committee desire to offer several suggestions regarding the continuance of the work in the future.

(1) That a committee should be appointed at the expiration of one series of meetings to take charge of the succeeding series.

(2) That the Alumni Association should heartily co-operate with the College, by bringing the necessity for upholding and attending these meetings prominently before its members.

(3) That our students should be impressed with the importance and value of these meetings and that our graduates should go forth with the remembrance that their Alma Mater expects them to contribute their observations and contributions to scientific pharmacy through the medium of its institutions.

(4) That the drug trade should be made to realize that these meetings are largely for the benefit of the fraternity, and that as practical pharmacy is made up of a host of small operations, so no observations, no points in manipulation, improvements in processes or suggestions are too trivial for discussion. By such discussions much of allied interest and value will be brought forth.

GEORGE M. BERINGER,
J. W. ENGLAND,
HENRY TRIMBLE,
WILLIAM MCINTYRE.

Prof. Maisch made a motion to tender the thanks of the meeting to the committee for the faithful performance of their difficult task, and in appreciation of their services to request the same committee to take charge of the meetings for the next series. The motion was seconded and carried.

It was mentioned in this connection that considerable credit is due the College for maintaining these meetings uninterruptedly for thirty years.

Mr. Alexander Turner gave some interesting data concerning *prescriptions* compounded at his store; one thousand were looked over containing 2764 specifications, of these 2388 were for U. S. P. articles, 264 non-officinal drugs neither patented nor proprietary in character, and only 112 patented or proprietary drugs, making only about *four per cent.* of the last class.

Mr. McIntyre recently found about nine per cent. of this class prescribed in one thousand prescriptions. This justifies the expression made after the statement that it speaks well for the Philadelphia physicians.

Mr. Thompson showed the meeting some specimens of *cucumber juice*, which had been preserved by addition of salicylic and boric acids, also by an addition of alcohol.

Before adjourning for the summer the members all agreed to assist the Committee in charge, to their utmost, and make the next series even more successful than the present one.

FRANK X. MOERK.

AMERICAN PHARMACEUTICAL ASSOCIATION.

For the second time since its organization in 1852, the American Pharmaceutical Association has held its meeting far in the South. In addition thereto three meetings have been held in the northern section of the Southern States, namely, two in Virginia, and one in Kentucky. The first meeting in the heart of the Southern States was held in Atlanta, Ga., in 1878, and though called in September, had to be postponed until late in November, on account of the yellow fever having become epidemic in some portions of the South, mainly in the Mississippi Valley; it was the only meeting held that late in the year. On the other hand, the New Orleans meeting has taken place two months earlier than the San Francisco meeting, and thus the two southernmost meetings mark the earliest and latest dates at which the Association has convened at its annual gatherings, the large majority of which were in the month of September.

The large drill hall of the Washington Artillery, of New Orleans, located on St. Charles Street, was festively decorated with flags and bunting for the 39th annual meeting of the American Pharmaceutical Association, which was called to order by President A. B. Taylor, on Monday afternoon, April 27. After prayer had been offered by Rev. Dr. W. A. Snively, Mayor Jos. A. Shakspeare spoke words of welcome to the visitors, to which Vice-President Stevens replied.

President Taylor then delivered the anniversary address, in which he referred to the increase in the Schools of Pharmacy, and to the fact that in forty of the States of the Union State Pharmaceutical Associations had been organized since the year 1867. He briefly reviewed the decennial revisions of the U. S. Pharmacopœia since 1840, when for the first time pharmacists participated, officially, in this labor, until in recent years a much more active interest had been taken in the work of perfecting the national pharmacopœia by pharmacists than by physicians. Referring to the complementary branches of the healing art, note was made of the growing sentiment of harmony between the professions of medicine and pharmacy, as an evidence of which was cited the formation of a Section of Materia Medica and Pharmacy by the American Medical Association, at which

a large delegation of pharmacists had been invited. The importance of collecting the formulas for special preparations in local use had been recognized by the Association at an early date, and more recently has led to the publication of the "National Formulary," which, in its subsequent editions will doubtless continue its aim at greater professional uniformity in prescriptions. Among the numerous valuable papers read before the Association it would seem that two have exerted a special influence on the progress of pharmacy, namely, one by Israel J. Grahame, in 1858, on "The history of Percolation or displacement, and its application to Pharmacy;" and the other by William Procter, in 1859, on "Fluid Extracts and Oleoresins." Reference was also made to the researches on synthetical organic compounds and on proximate principles, and to the influence which these observations exert upon the use of old-fashioned galenical preparations.

President Taylor then turned to the internal affairs of the Association, referred to the invitation extended at the preceding meeting for holding an international pharmaceutical congress, at Chicago, in 1893; to the organization of a "World's Congress Auxiliary," at Chicago; to the so-called "cut-rate problem;" to interchange of certificates of State Boards of Pharmacy; to the use of the Centennial Fund, and to various amendments to the by-laws which seemed to be desirable. In closing his address, President Taylor alluded to the usefulness of the Pharmaceutical Society of Great Britain during the fifty years of its existence, the anniversary of the foundation being celebrated in May, and suggested that efforts be made for prohibiting, by national legislation, the allowance of a patent to any medicinal preparation.

The address was well received and was referred to a committee consisting of Messrs. Hurty, Trimble and Pennel.

Eighty-four candidates were admitted to membership.

The list of delegations showed that nine Colleges of Pharmacy, twenty-two State Pharmaceutical Associations, five county and city associations, and three Alumni Associations had appointed delegates to this meeting; later on, the credentials of four or five other associations were received.

Committee reports being called for, the Committee on Prize Essays was granted further time to make their report, and present it to the Council. The other reports were, for the present, laid upon the table.

The Nominating Committee was appointed by the selection of two members from each of the 27 States represented at this meeting; in addition thereto the Chair appointed Messrs. Alexander, of Missouri; Ebert, of Illinois; Remington, of Pennsylvania; Patch, of Massachusetts, and Chalin, of Louisiana, from the Association at large. A motion made that the Committee be instructed to present the names of two members for each office to be filled, was lost.

A committee, consisting of Messrs. Sheppard, of Massachusetts; Remington, of Pennsylvania; Keppler, of Louisiana; Eckford, of Mississippi, and Hollister, of Wisconsin, was appointed to consider and report upon the time and place of the next annual meeting.

The minutes of the Council, read by Mr. Kennedy, were approved. The invested funds consist of the following: Ebert Fund, $759.82; Centennial Fund, $1,463.72; Life Membership Fund, $10,007.34. The total face value of the bonds was $9,800; their market value, $11,907; the cash balances, $323.88.

Including a cash balance on July 1, 1890, of $4,140.57, the Treasurer reported a total income to March 15 of $9,206.39; total disbursements, $4,464.90; cash on hand, $4,741.49.

For account of the National Formulary, during the same period, there was reported: Cash receipts, $543.04; expenses, $198.75. The total receipts from this source, since 1888, were $6,067.64; total expenses, $4,104.81; total cash profit, $1,952.83.

The Committee on Membership, reported the decease of nine members and one honorary member, H. B. Brady, since the last meeting.

The amendment to the By-laws creating a Standing Committee on Transportation, which had been proposed at the preceding meeting, was called up for action, the number of members was increased from five to nine by one member each from Boston, Atlanta, Denver and San Francisco, and then adopted. The vote was reconsidered at the next session, and the by-law modified by charging the Council with the appointment of the Chairman and Members of the Committee on Transportation.

Professor Oldberg presented a communication from the World's Congress Auxiliary of the World's Columbian Exposition in Chicago, stating that a special committee, consisting of Messrs. Oldberg, Sargent, Ebert, Dyche and Hogan had been appointed for the purpose of promoting the holding of a pharmaceutical congress in 1893, and tendering to the Association, in advance, whatever facilities may be in the Auxiliary's power to extend. Some discussion was occasioned in view of the action previously had by the Association, and it was deemed best to refer the whole subject for consideration and report to a committee consisting of Messrs. Gordon, Whelpley, Holl ster, Good and Simon.

The amendment to the Constitution, proposed in 1890, creating the office of Assistant Secretary, was, at the suggestion of its mover, Mr. Ebert, indefinitely postponed.

By vote of the Association in 1890, the Treasurer's bond had been reduced from $10,000 to $5,000. On motion and proper consideration, the By-Laws were amended accordingly.

An adjournment was then had until Tuesday morning.

Second Session.—After the reading and approval of the minutes of the first session, in the absence of the Chairman of the Committee on Nominations, the Council presented the names of 63 candidates for membership, whose applications were approved by the Association.

A report from Professor Diehl, Chairman of the Committee on National Formulary, was read, stating that in view of the approach of the issue of the new United States Pharmacopœia, preliminary steps had been taken towards organized action by the Committee for revising the National Formulary as promptly as possible after the issue of the Pharmacopœia; that a circular-letter had been issued to the forty-four members of the Committee; that up to the time of writing the report only sixteen acknowledgments had been received, including one from California, containing a number of practical formulas and suggestions; and that the hope was justified of sufficient progress being made by the next annual meeting to justify the expectation of an early revision of the Formulary.

The Committee on Adoption of the Metric System presented a report, request-

ing authority to memorialize Congress with the view of securing, if possible, the adoption of the prototypes presented by the International Metric Bureau, as the standards for weights and measures of the United States as provided for by the Constitution. A resolution to this effect was passed unanimously.

The Nominating Committee presented a report, placing in nomination for the ensuing year for President, Alexander K. Finlay, of Louisiana; for Vice-Presidents, George J. Seabury, of New York; W. H. Torbert, of Iowa, and L. T. Dunning, of South Dakota; for Permanent Secretary, John M. Maisch; for Treasurer, S. A. D. Sheppard; for Reporter on the Progress of Pharmacy, Charles Rice; and for Council Members, J. M. Good, Adam Conrath and C. T. P. Fennel. The nominees were duly elected.

Professor Fennel referred to the many valuable services rendered to the Association by Professor Diehl, who had declined a re-election as Reporter on the Progress of Pharmacy, and moved for the appointment of a Committee to draft proper resolutions embodying a vote of thanks to this retiring officer. The chair appointed as such committee, Messrs. Fennel, Ebert and Heinitsh.

In this connection it may be stated that rumors had reached the place of meeting of the serious illness of Professor Diehl; but we are pleased to have learned since then, that while he was at that time suffering from sickness, this had at no time been as alarming as had been currently reported, but on the contrary that he was convalescent and in a fair condition of recovering his usual good health.

After hearing the report of the Committee on Publication the Association passed a resolution requesting that Committee to offer the older volumes of the Proceedings at a low figure and to send the price-list to the various pharmaceutical journals with a request to publish it.

The report of the Committee on the next annual meeting, recommending it to be held at the Crawford House, White Mountains, on the second Monday of September, 1892, created considerable discussion, during which Galveston, Tex., Cresson Springs, Pa., Nashville, Tenn., New York City and Denver, Col., were suggested as suitable places for holding the next meeting. Cresson Springs was selected; but at the last session the vote was reconsidered, and the original report of the Committee was adopted, naming the Crawford House, but changing the date to the first Monday of September, 1892, unless the Council shall find it better to change the date or the hotel at which the meeting is called.

Mr. Ebert moved an amendment to Chapter vi, Article viii of the By-laws, by adding a new Section, requiring the Council to decide upon the place and time of the next meeting and to announce its decision at the second session of the Association. The proposed amendment was laid over for future consideration.

The amendment to the By-laws offered at the preceding meeting in relation to an admission fee payable by new members on joining, was, on motion of Mr. Ebert, indefinitely postponed.

The Committee on the President's address presented a report, which was accepted; the Committee took it again in charge for the purpose of preparing resolutions based upon the recommendations, for action by the Association.

The Section on Commercial Interests held a session on Tuesday afternoon and its second session on Wednesday morning, Chairman Canning presiding.

The subject discussed was the cutting of prices on selling proprietary articles at retail, and the remedies against this practice. A number of communications were received and a resolution was presented by Mr. Hallberg, stating several propositions upon which an effective plan should be based. The resolution and all communications were referred to a committee of nine, including the Chairman of the Section, for consideration and report. The deliberations of the Committee resulted in a plan involving the co-operation of manufacturers, distributing agents and retail druggists, the former to sell medicinal proprietary articles only to druggists having signed agreements (excepting in those localities where no druggists are in business), the retail druggist to sign an agreement not to violate the conditions as to retail prices, or to sell to dealers on the cut-off list, or to substitute another article for one called for; any violation of the agreement to subject the party to being placed on the cut-off list

The plan was adopted, and the Association was asked to appropriate $200 to defray the expenses of carrying out the plan. The preamble which, as adopted, declared that medicines should be sold only by druggists who have been educated to properly perform their duties, was subsequently erased by the Association.

The election of a Committee to serve for the ensuing year, resulted in the choice of W. H. Torbert, of Iowa, as Chairman, Arthur Bassett, of Michigan, as secretary, and Chas. M. Ford, of Colorado, Chas. Holzhauer, of New Jersey, and G. L. Hechler, of Ohio, as the remaining members of the Committee.

The Section on Scientific Papers held three sessions, two on Wednesday afternoon and evening, and the last one on Thursday afternoon. Prof. Patch presided and Prof. Hallberg acted as secretary. The following papers were read:

The general features of the vegetation of Louisiana and adjoining region, and its products in relation to pharmacy and allied industries was the subject of a paper read by Dr. Chas. Mohr, of Mobile, Ala. The author characterized the climate, equally free from the extremes of heat and frost, and favored with an abundant rainfall during the year, as furnishing conditions most favorable to arboreal growth. The blending of southern and northern plants is noticed among the trees as well as among the crops of the field and garden; palms (Sabal) with short stems grow in the shade of the pine; the magnolia side by side with the beech; the yucca shares the ground with the American holly; the pear ripens its fruit with the orange and Japanese plum (*Eriobotrya japonica*); beside the crops of northern fields, sugar, cotton and rice are produced. In Louisiana the subtropical forest, distinguished by the prevalence of broad-leaved evergreens, is presented in its characteristic features, and many shrubs, most of them adorned by a profusion of flowers, add to the beauty and interest of the woods. Passing to the products, a somewhat extended sketch of the turpentine industry was given, and references were made to the wine obtainable from the Scuppernong grape; to the timber of the bald cypress (*Taxodium distichum*); to the sugar cane cultivated in the alluvial lands; to the fig growing in the lower half of the Gulf States, however, on account of its perishable nature in this damp climate, of no value commercially; and finally, to the ramie plants or China grass, *Bœhmeria* species, and to the jute plants, *Corcharus* species, which are easily grown in these localities.

For *Syrup of lactucarium*, a process of preparation was given by G. H. Klie, in which the waxy constituent is dissolved by ether, and the bitter principles by diluted alcohol. The use of *lead oleate* in the place of lead plaster was discussed by Prof. Stevens.

The assay of nux vomica was discussed by Prof. Patch. The exsiccated powder is left in contact with a measured quantity of Prollius' fluid (concentrated ether, 250 cc.; chloroform, 100 cc.; alcohol, 125 cc.; and strong ammonia water, 10 cc.), for about 24 hours. From an aliquot portion of the liquid the alkaloids are extracted by agitation with dilute sulphuric acid; the aqueous liquid is rendered alkaline with ammonia, and the liberated alkaloid extracted with chloroform and weighed after evaporation of the solvent. From the mixed alkaloids the strychnine may be determined by potassium ferrocyanide. The author gave a number of determinations which illustrate the variation of the total alkaloids between 1·25 and 3·9 per cent.; at the same time the variation in the proportion of strychnine to other alkaloids (brucine, etc.) was still greater, it being in some cases approximately 3 : 1; 2 : 1; 4 : 3; 1 : 1 and 2 : 3.

The cultivation of the orange and lemon in the Southern States was the theme of a communication by R. N. Girling; this paper contained many practical hints.

Caffeine salts, their preparation and composition. The researches of H. W. Snow demonstrate the conditions under which certain definite caffeine salts may be prepared, and give also the results of analyses of the hydrochloride, hydrobromide, nitrate, sulphate, salicylate, benzoate and valerianate of caffeine.

What is the duty of the professional pharmacist regarding patent medicines? This query was discussed by Mr. L. H. Leavitt, from the standpoint of the public and of the physician.

A specimen of Florida camphor had been procured by Mr. Heinitsh, and was exhibited at one of the sessions. It was then learned that the camphor tree had also been grown successfully in portions of Louisiana south of New Orleans.

The drug trade and the United States pharmacopœia was discussed in a paper by J. C. Means.

Thiersch's antiseptic solution consists of salicylic acid, 2 parts; boric acid, 12 parts, and distilled water, 1,000 parts. Adolph Levy recommends the preparation of tablets containing salicylic acid, 14 grains; and boric acid, 84 grains; one of these tablets is to be dissolved in a pint of hot water.

An accident case was described by A. Levy; it contains, packed in a convenient manner, all the necessary medicines, instruments and utensils useful in cases of accidents.

For *the manufacture of antiseptic material*, Dr. J. T. Davison explained some of the underlying principles. While the pharmacist could not, probably, compete with the large manufacturer as to price and style, he could, by conscientious attention to details, produce an article every way superior to those usually supplied.

Determination of the value of Mustard. Prof. L. E. Sayre suggests this valuation to be effected by distilling, in a glass apparatus, the volatile oil from a mixture of water and mustard, absorbing the vapors in an excess of solution

of silver nitrate, and at the close of the operation determining excess of silver by sodium chloride.

Scheme to establish a comparative standard for alkaloidal galenicals. The interest in the reading of this paper was enhanced by its author, Prof. J. U. Lloyd, performing the process experimentally with fluid extracts of guarana and of nux vomica, and demonstrating that its execution requires no special apparatus and merely ordinary skill, and that the process is quickly performed and yields the alkaloids colorless or white. The outlines of the process are as follows: 5 cc. of fluid extract are mixed, in a mortar, with an excess (1 or 2 cc.) of pharmacopœial solution of ferric chloride, and sodium bicarbonate, in powder, is then added with constant agitation until a stiff magma results; this magma is then triturated with successive portions of chloroform (about 20, then 10 cc., etc.) (tannin, coloring matters, gums, proteins, etc., are left undissolved), and the chloroformic solution, which readily separates from the magma, is decanted and evaporated, when the pure alkaloids will be left, and are weighed as such. Preparations containing fats or chlorophyll will yield the alkaloids contaminated with these principles; for purification the residue is dissolved in excess of dilute sulphuric acid; the solution agitated with ether, which will remove fat and chlorophyll; the aqueous liquid then rendered alkaline with ammonia, and the alkaloids taken up by agitation with chloroform.

A somewhat similar process was recommeded by Loesch in 1879 (see AMER. JOUR. PHARM., 1880, p. 15), in which the aqueous solution of the extract is mixed with alum, the mixture rendered alkaline with ammonia, then evaporated to dryness, and the powdered residue treated with solvents for the alkaloids. The differences in the two processes and the greater simplicity in the manipulation in the former are very apparent.

Professor Lloyd regards the following as average yields from good fluid extracts:

	Per Cent.		Per Cent.		Per Cent.
Aconite root,	0·40	Coca,	0·50	Ipecacuanha,	1·50
Belladonna leaves,	0·40	Guarana,	3 to 4	Nux vomica,	1·50
Belladonna root,	0·50	Hyoscyamus,	0·20		

It is obvious that in the above scheme ether may be substituted for the chloroform, if desirable. The statement made, that the process was not adapted for opium preparations, elicited the suggestion that, possibly, all the opium alkaloids, with the exception of morphine, could thus be removed, and that morphine might, possibly, be extracted from the residue by some suitable solvent and thus be obtained free from contamination with other alkaloids or coloring matter.

A vote of thanks was tendered to the author for the interesting paper and the clear manner in which the demonstration of the process had been shown.

Oil of Camphor as an adulterant was presented by Prof. Stevens, the aim of the paper being its detection when mixed with other volatile oils.

The preservation of mucilage of acacia was the subject of a brief paper by H. Tiarks.

Louisiana Perique tobacco was described by Prof. Metz, as to cultivation, curing and preparation for the market, the product being about 19,000 pounds; it is one of the strongest tobaccos, containing about 8 per cent. of nicotine.

The yellow coloring principle of Frasera Walteri, which was regarded as identical with gentisin by Kennedy, in 1873, but by Patch, in 1881, was shown to differ from gentisic acid in various reactions, has been further examined by Professors Trimble and Lloyd, who, by repeated crystallization from strong alcohol, succeeded in separating it into at least two distinct principles, one being dark yellow and fusing at 114° C., while the other was in fibre-like light lemon-yellow crystals, having the melting-point 178° C. Both compounds are nearly insoluble in water, sparingly soluble in petroleum ether and benzol, soluble in alcohol, ether, chloroform and glacial acetic acid; the alcoholic solutions are colored dark green by ferric salts, and are not precipitated by lead acetate; solution in sodium hydrate does not reduce Fehling's test. Two combustions made with each substance gave results indicating the formulas $C_{15}H_{15}O_6$ and $C_{16}H_{15}O_6$.

A test for the purity of lithium salts was described by W. L. Scoville, as follows: 2 gm. of the salt, as lithium citrate for instance, are placed in a porcelain capsule having the capacity of 40 to 50 cc., and slowly ignited until completely charred, when the full flame of a Bunsen burner is allowed to play upon the bottom of the capsule until most of the organic matter has been burned off. When the capsule has cooled, normal nitric (or hydrochloric) acid is drawn in from a burette, slowly at first to avoid loss by effervescence, until an excess has been added. After standing until the salt has completely dissolved, methyl-orange indicator is added, and the excess of acid ascertained with normal soda solution. Treated in this way, 2 gm. of lithium citrate should require not less than 28·55 cc. of normal acid; 2 gm. of lithium benzoate not less than 15·6 cc., and 2 gm. of lithium salicylate not less than 26·12 cc. Care must be taken to start with a perfectly dry salt.

Professor Patch had contributed the following practical papers:

Unchangeable Elixir of three phosphates. After reviewing several published formulas, the following is suggested:

Solution of Chloride of Iron U. S. P. 1880,	28 cc.
Quinine Alkaloid,	7·128 gm.
Strychnine Alkaloid,	·104 gm.
Acid Phosphoric, 50 per cent.,	27 gm.
Alcohol,	30 cc.
Simple Elixir,	300 cc.
Syrup, q. s., to make	473 cc.

Mix the solution of iron and the phosphoric acid, and in this dissolve the alkaloids. To this add the syrup, and then the simple elixir and alcohol, previously mixed.

This is not a very pleasant elixir, nor are the commercial articles of the same strength. It has also the objection of having very little color. This can, of course, be remedied by coloring. As it is the fashion to paint quinine red, this elixir might be colored with tincture of cudbear.

The Strength of commercial acids. The results of assays, including impurities present, are given of a number of samples of sulphuric, nitric and hydrochloric acids of ordinary commercial quality and of others sold as chemically pure.

Dilute hydrocyanic acid was found to keep not much, if any, better in

dilute alcohol than in water; a small percentage of HCl preserves from change.

Assays of nux vomica. Three samples of *nux vomica*, powdered unsteamed, yielded from 12·3 to 14 per cent. of extract, 3·39 to 3·9 per cent. alkaloids, and 1·64 to 2·5 per cent. of strychnine. Five samples of commercial *powdered nux vomica* gave 11 to 15·3 per cent. extract, 1·25 to 3·04 per cent. alkaloids, and ·92 to 1·52 per cent. strychnine. Four samples of *fluid extract of nux vomica* gave 10 to 12·8 per cent. extractive, and 1·63 to 2·37 per cent. alkaloids; the extractive of five commercial samples of the fluid extract varied between 3·47 and 11 per cent. Eight samples of *extract of nux vomica* varied in total alkaloidal strength between 15 and 24 per cent.; two commercial specimens yielded 11·5 and 11·7 per cent. of alkaloids. For the preparation of the *powdered extract* it is suggested that the percolate obtained with the pharmacopœial menstruum be evaporated to syrupy consistence, while still warm washed by agitation with benzin and decantation, then mixed with milk sugar, evaporated to dryness and powdered.

Commercial cinchona barks. The essay is a critical study of the methods for determining the total alkaloids and the quinine.

The assay of digitalis. Considering the properties of the different proximate principles of more or less medicinal activity, which have been obtained from digitalis, it is extremely difficult to devise a reliable process of assay.

Granular ferrous sulphate is recommended in the place of the pharmacopœial precipitated salt. It is prepared by dissolving 200 gm. of crystallized ferrous sulphate in 200 cc. of hot water, acidulated with 100 cc. of diluted sulphuric acid, filtering, evaporating to 350 gm., cooling quickly with continued stirring, draining the product and washing it with 50 cc. of alcohol.

The chairman in his address had suggested the creation of a special fund for aiding in researches to be laid before this Section. In view of the existence of the Centennial Fund, the interest of which is available for this purpose, no action was taken on the suggestion.

The Committee of this Section for the ensuing year consists of C. S. N. Hallberg, Chicago, Chairman; H. W. Snow, Detroit, Secretary, and J. N. Hurty, Indianapolis.

The Section on Legislation and Education held its session on Thursday evening, Professor Wm. Simon in the chair, and L. C. Hogan Secretary. The latter presented a report giving a synopsis of the pharmacy laws passed or modified in different States of the United States since 1889.

The chairman's address dwelt upon the difficulty of obtaining correct and reliable information on subjects of special interest to the Section and made various suggestions looking towards increased usefulness of College instruction.

Recognition of College diplomas by State Pharmacy Laws was the subject of the first paper read by Professor Remington. It is impossible to give, in a brief review, the arguments advanced in favor of the position taken by the author, and the causes which, in his opinion, have thus far operated against such recognition in a number of the States. The paper was discussed at considerable length, but without taking action on the suggestions, the other papers prepared for the Section were ordered to be read.

Practical suggestions and experiences in securing pharmacy laws was the title of a paper read by H. R. Slack, of Georgia.

Would reciprocity in registration be practical through the medium of uniform examinations? This question was discussed by Prof. Chas. M. Ford, of Denver. A certificate should carry unquestioned evidence that its holder, at the time of receiving it, was a thoroughly qualified pharmacist, and that he had been given a fair trial in practical fields; the American Pharmaceutical Association might thus be vested with the power of issuing certificates.

Extent and methods of instruction in Botany in Colleges of Pharmacy, by Prof. D. M. R. Culbreth, of Baltimore.

A method of dose instruction, by Prof. Geo. Spitzer, of Lafayette, Ind.

The drift of pharmaceutical education, by S. W. Williams, of East Orange, N. J.

College courses in Pharmacy, by Prof. C. S. N. Hallberg, of Chicago.

The last-mentioned paper presented a resolution "that colleges of pharmacy be requested to extend the term of their course of instruction at the earliest practicable time, to six months;" this was, on motion of Prof. Stevens, unanimously adopted.

The Section passed a resolution asking the Association to make future arrangements with the view of allotting time for the holding of two sessions by the Section; also requesting the appropriation of $50 for defraying the expenses in compiling statistics on legislative and educational matters.

The Committee elected for the present year consists of Professor A. B. Stevens, of Ann Arbor, Chairman; L. C. Hogan, of Chicago, Secretary; and John Kochan, of Denver.

Final Session of the Association.—This was held Friday morning, when, after the reading of the minutes, 20 candidates for membership were admitted.

The preamble and resolutions passed by the Section on Commercial Interests were revised, and the preamble was, on motion, stricken out.

A petition signed by forty ladies was presented in favor of changing the place of the next annual meeting from Cresson Springs to the White Mountains, which was adopted. Mr. H. M. Whitney, of Lawrence, Mass., was elected Local Secretary.

Appropriations were made as requested for the Section on Commercial Interests, $200, and for the Section on Legislation and Education, $50.

Various amendments to the Constitution and By-Laws were presented and laid over until next year. The amendment requiring the Council to decide, annually, upon the time and place of the next meeting was lost; but the amendment directing the president to appoint a Committee on Nominations at the first session was adopted.

The Committee on the World's Fair Auxiliary recommended the acceptance of the invitation of co-operation for holding an International Pharmaceutical Congress, in 1893, and the appointment of a Committee consisting of Messrs. Oldberg, Sargent, Ebert, Dyche, Hogan, Hallberg and *ex officio* the President and Permanent Secretary of the American Pharmaceutical Association.

Votes of thanks were passed to the Local Secretary, Local Committee, members of the Louisiana Pharmaceutical Association, the citizens, press, retiring officers, etc., and after the installation of the officers for the ensuing year the Association finally adjourned.

The entertainments provided for the members extended over the entire week. Some of the visitors reached New Orleans on Saturday, April 25, but

the majority of them arrived during Sunday. Most of the members from the Eastern and Central States went by way of Cincinnati and Chattanooga; those coming from the Southern Atlantic States by way of Atlanta, Montgomery and Mobile; and those from the Mississippi valley and from Chicago came over the Illinois Central Railroad; with few exceptions, all the visitors were provided with quarters at the St. Charles Hotel.

On Monday evening, a promenade concert and soiree dansante was tendered to the visitors, in the spacious halls on the second floor of the Washington Artillery Building. Tuesday evening was set apart for a vocal and instrumental concert at Grunewald Opera House. Wednesday was devoted by the ladies to visiting public institutions and to drives to different parts of the city and suburbs. The excursion on Thursday forenoon was participated in by all the members and their ladies. The steamer *Jesse K. Belle* left the levee at 9 o'clock, proceeding first to Chalmette Cemetery, the final resting-place of soldiers from the civil war. The boat then steamed up the Mississippi, passing the city, to the Ames crevasse where the rush of the waters through the broken levee, the view of the backwater and the sight of the half submerged negro shanties and the overflowed surrounding country proved interesting sights to the visitors, to whom its features were wholly novel. At the Fairfield plantation a landing was made for the purpose of viewing the sugar house and the orange grove on the grounds. It was 2.30 P.M. when the boat reached her wharf. After the final adjournment on Friday morning coaches were in waiting in front of the hall, and accompanied by the ladies, the members had a delightful drive up St. Charles Avenue to Audubon Park, where Horticultural Hall with its tropical and subtropical plants was the centre of attraction. The Marine Hospital was next visited, and the visitors were shown through the institution and served with refreshments. The drive was then continued, one or two cemeteries were visited, and a halt was made at the West End, with its handsome promenades on the shore of Lake Pontchartrain. After the return to the hotel about 5 or 6 o'clock, preparations were made for attending the banquet at Odd Fellows' Hall, which was decorated with evergreens and floral designs. After justice had been done to the elaborate menu, toasts were offered and responded to by Judge Fenner and Mayor Shakspeare; by Messrs. Alexander, Finlay, Remington, Seabury and Hallberg, members of the Association; and by Messrs. Sol. Marx, J. W. Glenn, C. L. Henry and C. C. Wickliffe, of New Orleans. The concluding speech was made by Rev. Dr. Snively, after which President Finlay presented to the retiring President, A. B. Taylor, a floral representation of the local badge used during the meeting, viz: a crescent and star, and the company separated after singing "Auld Lang Syne." On Saturday and Sunday most of the visitors took the trains for the homeward trip, or to some of the attractive places of resort near the coast of the Mexican Gulf. The visitors will long remember the numerous pleasant incidents of the generous hospitality of their New Orleans friends.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Pharmakognosie des Pflanzenreiches. Von F. A. Flückiger. Dritte Auflage. Mit einem geschichtlichen Anhange. Berlin. 1891. R. Gaertner's Verlagsbuchhandlung. 8vo. Pp. xvi and 1117.

Pharmacognosy of the vegetable kingdom. Third edition. With a historical appendix.

The first edition of this work made its appearance in 1867. Since that time pharmacognosy in its various branches has been cultivated by many scientists and specialists, and very considerable progress has been made in our knowledge of vegetable drugs—aside from their medical properties and therapeutic application. The results of these researches are embodied in the work before us.

Of similar works by the learned author, perhaps the one best known in North America is "Pharmacographia," of which two editions have been published, the first one by the author conjointly with the late Daniel Hanbury. This work will give some idea of the scope and the manner in which the subject is treated in the "Pharmakognosie." This latter work, however, confines itself chiefly to the drugs in common use in Central Europe, considering at the same time the different varieties coming from various localities or from closely related plants, and such impurities or substitutions as are occasionally met with in commerce.

The arrangement of the work is essentially identical with that followed in the preceding editions, with some slight modifications, and is based upon a systematic grouping together of the material according to external characters. The drugs are first divided into such without organic structure and into organized substances. The former class comprises the gums, gum-resins, oleo-resins, resins, etc., in all ten divisions, against only three divisions of the second class, namely, pulverulent drugs (starch, lycopodium, lupulin, kamala), galls, and plant organs or parts of plants. This last—the thirteenth—division is obviously the largest one; it embraces nearly three-fourths of the entire work, and is subdivided into cryptogamous and phanerogamous drugs, the latter requiring over two-thirds of the book, and being divided into two series. Subterraneous or partly subterraneous organs comprise the first of these series, and naturally are separated into rhizomes and roots of monocotyledons and of dicotyledons, the further classification being based upon characters of taste, and the presence or absence of starch, laticiferous ducts, etc. Aërial parts of plants constitute the second series, with five natural groups, viz: stems, barks (including cork), phyllomes (bulb-scales, leaves and herbs, inflorescences, flowers and parts of flowers), fruits and parts of fruits, and finally seeds and parts of seeds.

The heading for each drug contains its Latin and German names, the former according to the nomenclature used in Central Europe. Some idea of the manner in which the subjects are considered, may be formed by briefly quoting the subheadings of one drug with its allied varieties. Thus, under "Gummi arabicum" are considered its formation in the tissue; the plant and its distribution; collection; properties; composition; chemical behavior, and history, the whole occupying over nine pages. Then follow upon six pages the other gums resembling gum arabic, and notably Senegal gum; then gums from other parts of Africa, from India, from Australia, from South America

and from North America (gum mezquite). It will be observed that pharmaceutical and therapeutical considerations do not enter into the scope of the work. It is scarcely necessary to state that in connection with the organized substances the anatomical structure receives due attention; in fact, we generally find an explanation of the development of the plant part, its appearance as met with in commerce, its internal structure, and comparison with other articles liable to be mistaken for it.

Every page of the book bears evidence of the scrupulous care bestowed upon the text, the researches of the author and the collection and consideration of all available researches on each subject, the literature being very fully quoted.

The text is followed by an appendix containing biographical accounts of the more important old writers on materia medica, and historical notes on some interesting documents and publications; this appendix comprises 46 pages. A full index facilitates the use of the work.

Those who are familiar with Professor Flückiger's writings need not be told of their attractive character, the completeness and correctness of literary research, the lucidness of statements and the logical deductions. We know of no other work on pharmacognosy, that is so complete, so reliable, and even so fascinating as the one now before us; it will be a lasting monument to its author, and we feel assured that it will be read and studied with close attention by those interested in the materia medica of the vegetable kingdom.

Commentar zum Arzneibuch für das Deutsche Reich (Pharmacopœa Germanica, editio iii), mit vergleichender Berücksichtigung der früheren deutschen u. a. Pharmakopöen, von Dr. Bruno Hirsch, Apotheker in Berlin, und Dr. Alfred Schneider, Korps-Stabsapotheker in Dresden. Göttingen: Vandenhoeck & Ruprecht. 1890. 8vo, p. 720. Price, 13 Marks.

Commentary to the German Pharmocopœia with reference to, and comparison with, the former German and other Pharmacopœias.

This valuable work is now completed. In the December number of our last volume we have commented somewhat in detail on its scope, arrangement and excellent qualities. The expectations then based on the character of a portion of the work, have been fully realized. The value as a commentary on the new German Pharmacopœia is enhanced by occasional references to and comparisons with other pharmacopœias, for which purpose, aside from the old German and Prussian, those of Austria, Belgium, Denmark, Finland, France, Great Britain, Greece, Hungary, Japan, Netherlands, Norway, Roumania, Russia, Spain, Sweden, Switzerland and the United States have been used. As a practical and trustworthy guide to the apothecary the work will be appreciated by all who may consult it.

Materia Medica and Therapeutics, with Especial Reference to the Clinical Application of Drugs. By John V. Shoemaker, A.M., M.D., Professor of Materia Medica, Pharmacology, Therapeutics and Clinical Medicine, and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia, etc. Philadelphia and London: F. A. Davis, publisher. 1891. 8vo, p. 640. Price, cloth, $3.50; sheep, $4.50.

Published as the second and last volume of a "Treatise on Materia Medica, Pharmacology and Therapeutics," this volume is paged consecutively with the

first one from page 355 to 994; but it is independent of the former and complete in itself.

The drugs are enumerated in alphabetical order; the inorganic chemical compounds and the organic salts of metals are grouped together under the chief or basylous element, while the crude drugs with their preparations are found as a rule under their pharmacopœial names, or in case two or more parts of the same plant are officinal, under the name of the plant, under which likewise the non-pharmacopœial vegetable drugs are to be looked for. An exception is Ustilago which, for no obvious reason, is described under the heading of Maïdis Ustilago, and two separate headings have been made for products of the maize plant, viz: maidis stigmata for corn silk, and Mays for the fruit, meal and starch; in this latter case the differences in the medical uses of the articles has evidently decided the division. A large number of the recently recommended vegetable and chemical remedies are considered including Koch's famous remedy tuberculin and the so-called spermine, introduced by Brown-Séquard.

Descriptions of the different articles are not given, but usually a few prominent characteristics or, in the case of crude drugs, the chief medical constituents are briefly mentioned for the information of the physician, for whose special use the book has been prepared; attention is, therefore, mainly given to the subheadings physiological action, therapy, doses, hypodermic administration, poisonous effects, treatment of poisoning, and others. An appendix contains seven pages of formulas for hypodermic use, and a very complete table of doses, which occupies six pages in double columns. The introductory chapter treats of the classification of medicines.

The work is an excellent compendium for the use of the physician, and is easily consulted by virtue of its alphabetical arrangement, and of a copious index of drugs and preparations.

Fever: its Pathology and Treatment by Antipyretics; being an essay which was awarded the Boylston prize of Harvard University, July 1890. By Hobart Amory Hare, M.D., B. Sc., etc. Philadelphia and London: F. A. Davis, publisher. 1891. pp. 166. Price, $1.25.

When presented to the Boylston Prize Committee in 1890, the title of this essay was "The uses and values of antipyretics." Under the headings of experimental evidence and clinical evidence are considered the action and application of antipyrin, anti-febrin, thallin, phenacetin, and salicylic acid and its compounds, and numerous observations are described, and the literature on the subject is copiously quoted. The author regards antipyrin as taking the foremost rank as an antipyretic, with antifebrin next, and these followed by thallin and phenacetin, with perhaps a preference for the latter. Antipyrin also takes the lead as an analgesic, followed by phenacetin and antifebrin, while thallin possesses hardly any such power. In rheumatism the salicylates act better than the rest of these antipyretics.

A dermatological Bibliography, compiled by George Thomas Jackson, M.D., New York. Presented to the American Dermatological Association, in 1889, and issued as part of its Transactions for 1890. New York. 1890. 8vo. pp. 91.

A classified catalogue of books on syphilis and skin diseases, giving in most cases the place and date of publication and the price.